

General publications
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Haldimand-Norfolk Study

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Some of the detail on the original Forest Land Use maps has been omitted from the maps appearing in this volume. The original maps are available for examination at the Ontario Ministry of Treasury, Economics and Intergovernmental Affairs, Urban and Regional Planning Division, 801 Bay Street, Toronto Ontario. Also, Agricultural Land Use Map 1 is not included in this volume. It is the set of soil series maps prepared by the Ontario Ministry of Agriculture and Food and is available from that Ministry.

Cartographer: Geoffrey Matthews

Introduction

General Purpose of Study and Approach

was the objective of the Environmental Appraisal to identify and assess patterns of natural and cultural (manmade) land-based resources which, when combined with economic and sociological studies, would serve as a rational basis for a regional plan for the combined land area of Haldimand and Norfolk Counties. As the development of a plan for any particular area is influenced by the characteristics of the area contiguous to it, parts of Grant, Elgin and Oxford Counties were studied as well, as illustrated on the County Boundaries map.

Factors studied included various resources, physiographic patterns, scientific patterns, landscape personalities, ethnic characteristics and environmental corridor patterns, as presented in detail in Volume I of the appraisal. It was the further objective of this study to identify, in a general way, lands suitable for urban and industrial development, lands which should be reserved for agriculture, forestry, recreation, and to identify various other land and cultural resource features for conservation or preservation. Particular attention should be drawn to the major context of the study which recognized the immediate prospect of large-scale industrial and urban development in an area in which a prosperous agriculture has been historically practised.

It is also important to draw attention to a unique and probably unprecedented approach to comprehensive planning in North America that was adopted in the Haldimand-Norfolk study by Mr. N. H. Richardson in his capacity as Study Director.

This was the decision on his part that the land resource base should be studied thoroughly and the information derived should be a plan determinant along with the traditional areas of economics and social equipment.¹ This is the need and the challenge of contemporary planning, for it is not possible to prepare a meaningful comprehensive plan without involvement and contribution from a large number of disparate disciplines, each

with an interest in the environment but from a different and important point of view.

The foregoing presented the question of whether the synthesis and recommendations contained in this volume should be presented according to the disciplinary areas defined in Volume 1 or whether they should be presented according to principal land uses and general resource considerations. The latter course was chosen, with a consequent major re-arrangement of findings, resulting in what is felt to be a more cogent and readily applied statement.

Lastly, it should be pointed out that according to the terms of reference, the Appraisal was to be based upon published and otherwise documented data rather than upon intensive field investigations. This approach, understandably, may have resulted in voids and less than thorough treatment of certain investigations. Due to limited documentation of landscape quality this subject was investigated in the field, a principal constraint being the size of area—approximately 2000 square miles—in relation to time and resources available.

Rationale

In the development of a plan for an area of land, both local and regional in scale, there is a hierarchy of considerations to be made. Each of these considerations carries with it a certain degree of choice, ranging from none at all to that which allows a high degree of flexibility. Some of these are discussed here briefly as the rationale for the planning and development of the Study Area, from the point of view of the land-resource orientation of the Appraisal. Some are based on scientific principles while others involve peculiarities of the Study Area as they relate to its impending growth.

This study has not undertaken to deal with criteria except as implicit in the rationale, the general objectives and the numerous considerations related to policy and management recommendations.

1) If this study can be said to have a theme it is that the phenomenon of

environmental homeostasis—the balance of organisms between each other and their supporting physical base—must be achieved at a regional and individual level. The region has been examined as a giant ecosystem composed, in turn, of biotic and human ecosystems, in which all of the elements of the natural and cultural landscape must be in harmony, perpetuating each other's welfare through the process of symbiosis. The consequences of disrupting this interdependence are stress on the organisms and the physical base from which they draw their sustenance. The stresses can result in various manifestations of ill health, some of which may be healed while others are irrevocable, either in life or in property, or in both. *The ecological process in regional planning is undeniable and it is the first order of consideration.*

2) Physical and physiological health, in its simplest terms, is important but applies mainly to lower life and the condition of its physical base of soil, water and air. Man, however, is characterized by emotional qualities related to his perceptual sensibilities. For his emotional health he relies upon a large pool of sensory stimuli, esthetic in character; many are derived from nature and if they are not available, then emotional health is impaired. This phenomenon, too, is undesirable. It is for this reason that intra-regional diversity and contrast manifested in a multitude of forms are major criteria in contributing to an internally balanced environment.

It is evident from the two factors related above that physical and emotional instability can result in economic disadvantages and social ills characterized by crime, poor physical and mental health, and so on. Evident also is the need for a completely integrated approach to regional, environmental, social and economic planning.

3) From the natural resources point of view, "the best possible environment" can be assured not only through creation and sympathetic manipulation of open spaces and elements within them,

but also through preservation for posterity of sizable blocks of natural areas having strategic value, both in quality and location. The achievement of this objective can be realized through the employment of land use ecology in which integrated units of non-living (physiographic) and living environments are used to measure comparative changes in the total production system, subject to stresses in the process of making land use adjustments.

4) A somewhat more specific extension of the above statement is the following proposition which has a high degree of relevance in the Study Area at this time:²

The area is beautiful and vulnerable;
Development is inevitable and must be accommodated;
Uncontrolled growth is inevitably destructive;
Development must conform to regional goals;
Observance of conservation principles can avert destruction and ensure enhancement;
The area can absorb all prospective growth without despoliation;
Planned growth is more desirable than uncontrolled growth, and more profitable;
Public and private powers can be joined in partnership in a process to realize the plan.

For every measure taken to generate development such as industrialization, urban growth, construction of roads, power stations and air fields, etc., there must be other measures taken to restrict development—not for the sake of restricting development itself but to protect valuable space for recreational, institutional, and related purposes which would result in a living and working environment containing all of the essential ingredients for a balanced and wholesome life.

5) It appears that all of the climatically favored areas of Canada that are capable of producing specialized food crops are being subjected to intensive

pressures of urbanization and industrialization. This includes much of southern Ontario, especially some of the Lake Ontario hinterland, most of the Niagara Peninsula, the lands immediately north of Lake Erie, the Okanagan Valley and the lower mainland of British Columbia. The extent and rate at which industrialization and urbanization should be allowed to expand into these favored areas must be examined in Canada at all levels of government and by the planners and the people. This examination must be made within the national context of meeting demand of future generations for specialized horticultural and agricultural food products, including the fruits, vegetables, and canning crops that can grow in these areas favored by climate and soil. In particular, the microcosm of the Haldimand-Norfolk Study Area, with its own highly favored soils and climate, must exercise a responsible role in planning to meet these national needs.

6) The Study Area lacks easily accessible open space with a high absorptive capacity for recreation and landscape interest, such as is available to residents of the metropolitan Toronto area. This locational disadvantage should receive priority consideration in the development of a regional plan for the Study Area. In respect to availability of strategic open space, countryside preservation, and conservation policy, particular attention must be given to articulation of every feature of the rural area for recreation. Also, some of the natural landscapes of the Study Area are an important asset not only at the regional but also at the provincial and national levels.

7) With burgeoning population growth, the countryside and natural areas with the wide variety of resources they possess will assume increasing importance in the face of rapidly expanding pressures. Provision will need to be made for the preservation, conservation and improvement of these resources by implementing new legislation and policy at the provincial and local levels. The claims of amenity versus land for

production and urban and private use will need to be reconciled by the area residents and between departments of government.

8) Because of the significance of the Lake Erie shorelands corridor for a variety of land uses, a carefully conceived concept must be developed, and rigidly adhered to, for the long-range allocation of the use of this land. Any rationale for this future development should be based upon needs ranging from those purely economical to those social and ecological, and upon detailed landscape planning and design considerations which are not characteristic of North American planning and development attitudes, policies and practices.

9) While it was the objective of the Appraisal to inventory and to analyze land-based resources in respect to the significance in a comprehensive regional plan, it was also an important objective of this study to recommend conservation and management policies for their maintenance in order to ensure a comprehensive viable regional environment for the future.

Regional Goals

In defining goals for Ontario's regional development program, the Honorable John Roberts, Prime Minister of Ontario, stressed the belief that "regional plans and priorities should always contribute to the total environmental development and economic performance of the 'whole' province" and that "regional development policies are aspects of a broader provincial growth policy".³

While regions do, in fact, vary greatly in terms of characteristics and needs, there is, to a large degree, a commonality of goals that are the aspirations of all of the people of Ontario. Some of these goals, which are applicable to the Study Area, may be stated as follows:⁴

Economic Structure

1) To develop in a manner consistent with the locational and space require

ments of the region's major economic activities.

and

-) To preserve the unique attributes of the regional landscape.
-) To minimize the urban use of productive agricultural land.

Environment

-) To minimize the pollution of water and the atmosphere.
-) To facilitate and maintain a pattern of local communities.

Accessibility

-) To minimize time-distance for the essential population movements between the major functional areas.
-) To maximize opportunities for using specialized services and facilities.

Cost

-) To minimize the cost of moving goods within the region.
-) To minimize the cost of essential public services.

Change

- 0) To develop in a manner consistent with the needs arising from long-term population trends, particularly future growth and changes in age, household size and composition.
- 1) To develop in a manner consistent with emerging and probable future technological innovations, *i.e.*, to be able to facilitate, adjust to, and receive the benefit of such possibilities.
- 2) To develop in a manner consistent with the needs arising from social changes, based on future economic and technological developments, *e.g.*, changing patterns of leisure.

An observation is offered on the above regional goals. While it is implied that there should exist a harmony of compatible land uses to achieve certain desired social goals, it is not clearly stated that there should be achieved a regional "environmental homeostasis" as explained in the Rationale above. Explicit in this statement is that there should be an inter-locking of hierarchical natural and social systems that would ultimately manifest itself in sound

health and economic well-being at the personal and social level with a minimum of dislocation of the land resource base.

Planning Policies

While it is not entirely accurate to say that planning has not achieved all of the goals to which it has aspired, there has been self criticism. For example, a British Government paper made the following assessment of its planning problem:⁵

"Three major defects have now appeared in the present system. First, it has become overloaded and subject to delays and cumbersome procedures. Second, there has been inadequate participation by the individual citizen in the planning process and insufficient regard to his interests. Third, the system has been better as a negative control on undesirable development than as a positive stimulus in the creation of good environment."

Within the Province of Ontario there exists a void in fundamental regional policies. The following policy was announced by the Government of Ontario in a white paper on regional development:⁶

"... That regional resource policies encourage adequate development of the natural environment while conserving the aesthetic and ecological balance qualities of the environment."

It is timely to analyze the above statements from the point of view of this study—that is, a study in regional landscape planning that deals with planning at a scale more detailed than conventional regional planning. It would appear part of the reason that planning has fallen short of its goals is that it has concerned itself with neither the planning of details readily comprehended by the layman nor with the execution of projects that would gain the layman's support for environmental planning in general.

In the Joint Statement on regional and resource policies referred to above, reference was made to the analysis of 63 indicators of social and economic change used in preparing regional plans. The point to be recognized here is the inconsistency between

the policy and its execution. The policy and ecological qualities of the environment outlines the importance of aesthetic, but in actual practice emphasis is placed upon social and economic problems to the exclusion of the land resource base, which should be the first order of consideration in regional planning. The policy, if implemented fully, could produce a balanced and rational plan based upon thorough consideration of all three major subject areas—land resources, economics and social resources.

It is hoped that the Appraisal, with its study of "indicators" and through its detailed insight into both very local and regional problems, will fill this void in comprehensive analysis of the environment; also, that it will create enough citizen interest, participation and support to achieve a fully integrated plan which will, in fact, be executed in detail according to the strategy envisaged in its original concept.

As may be seen in the main body of the synthesis, numerous facets of single resource utilization and land use allocation were analyzed with the objective of achieving patterns of information integration. These informational patterns are intended to serve as principal guides for planning at the regional and local levels, establishment of policy for programs of inter-departmental, and citizen cooperation for policy-making. This, in turn, would result in firm and realistic guides for the development and management of resources and social equipment for social and economic benefit. Hopefully, then, these planning and management policies would ultimately result, as well, in the creation of an efficient resource base of agriculture, landscape, forestry, recreation and wildlife. At the detailed level this would consist of such considerations as energy-transportation corridors, noise as a significant environmental pollutant, leisure driving, hiking and riding routes, eyesores, integrated resource management, land reclamation, social facilities for the preponderantly young future population of the Study Area, and so on.

As the new kinds of legislation,

policies and attitudes which will be required in regional resource planning and development, especially in relation to the countryside, do not exist in the Province of Ontario, it would be desirable for the planners and citizens of the Study Area to travel abroad with a view to examining innovations and their applicability to local conditions.

Plan Implementation and Landscape Resource Management

Because of the management implications of the recommendations contained in this Environmental Appraisal, the information should be considered useful not only for preparation of a regional plan but also as a guide to various resource management agencies, in order that the general aims of the regional plan may be realized by collective, integrated action at the management level. *The implications of this statement must not be underestimated.* It will involve unprecedented cooperation between various government agencies under the aegis of new technical and lay bodies created specifically for this purpose.

Also, the resource management implications of a plan, regional in scale, will require the creation and application of new land use standards and development controls for the rural areas paralleling land development and use standards characteristic of official urban plans. This would add a completely new dimension to regional planning that would blur the distinction between traditional regional planning on one hand and regional resource development and resource management on the other, so that both would be viewed as a continuum. To achieve this continuity of process a much greater liaison will need to be developed, with mergers wherever possible in order to achieve plan implementation at the site scale, coordination of effort and fiscal efficiency. Obviously, this would necessitate a review of powers of innovation and implementation on the part of both regional and local government and also the changing role of provincial regional personnel in relation to regional government agencies.

Further Synthesis of Environmental Appraisal

As quoted in the foreword to the first report of the Haldimand-Norfolk Study, the Economic Council of Canada explained that rising prosperity generates new desires and increased expectations that will ultimately be manifested in great challenges to Canadian decision-makers in the realm of increased demands, competing claims and priorities.⁷

The increased demands on the resources of the region, and their consequent deterioration, have been well documented in the Appraisal but these same phenomena and those referred to by the Economic Council will not only continue but will do so with greater intensity. The concept of melding regional planning with regional resource development and management has already been discussed above but here it should be pointed out that the optimal resolution of competing demands in a free-enterprise, democratic society will demand a further detailed assessment of the synthesis presented in this report. This is the problem confronting the residents of the Haldimand-Norfolk area whose commitment, without choice, to a healthy economic, social and physical environment is an unparalleled challenge.

Because of the value judgments implicit in resource utilization, the synthesis presented here cannot be expected to be complete; it can be only the beginning of a long process of further inventory, analysis and decision-making. Underlying this decision-making, of course, is the traditional economic cost-benefit approach. But where the objective is a high quality of life in the best possible environment, then personal and social value judgments render the economic cost-benefit ratio useless.

A number of investigators have studied this subject, including McHarg, who concluded that "The method requires that we obtain the most benefit for the least social cost but that we include as values social process, natural resources and beauty."⁸ He has applied successfully the least-social-

cost/maximum-social-benefit solution, a relative-value system that could consider many non-price benefits, savings and costs, and not least, the measure of scenic experience as a potential value.

A basically similar approach was used by British landscape planners for smaller areas which incorporated the value judgments of people from various sectors of society. This approach is presented for consideration in Appendix A.

Footnotes

¹Volume 1 of the Environmental Appraisal consists of the following major subject areas: Historical Background, Geology and Geomorphology, Meteorology and Air Pollution Climatology, Historical Ecology, Water Resources, Forest Land Use, Agricultural Land Use, Fisheries Resources, Wildlife Resources, Water Quality, Soil Suitability for Urban and Industrial Uses, and Landscape Quality.

²"The Proposition" from McHarg, Ian L. *Design With Nature*. 1969, p. 82.

³*Design for Development: Phase 1*, April 5, 1966.

⁴*Choices for a Growing Region: A Study of the Emerging Development Pattern and Its Comparison with Alternative Concepts*. Department of Municipal Affairs, Community Planning Branch, November, 1967.

⁵*Town and County Planning*. Ministry of Housing and Local Government, Scottish Development Department, Welsh Office.

⁶*A Strategy for Southwestern Ontario Development*. A Joint Statement by the Department of Treasury and Economics and the Department of Municipal Affairs, March 17, 1970.

⁷*Toward a Land Use Plan for Haldimand-Norfolk*. Haldimand-Norfolk Study, Ontario Department of Municipal Affairs, March, 1970.

⁸McHarg, Ian L. *Design With Nature*. Natural History Press, New York, 1969, p. 34.

1/Agricultural Land Use

Factor	Consideration	Response
General		
1) Strategic location of Study Area for agricultural economy.	Long-term consideration of strategic factors.	Planning criteria should recognize Study Area (a) is located in relatively favorable area for production of fruits, vegetables and field crops requiring relatively long frost-free period, (b) has a preferred market in the highly populated Golden Horseshoe for these agricultural products which are perishable and bulky and, (c) has distinct economic advantage of high soil productivity. Problem to be overcome in decline of agriculture industry is adoption of new crops and technology in Haldimand County, especially for the medium-sized farm. Suitable crops are available now, but there is always new technology and crop information coming out.
2) Agricultural soil capability.	Conservation of agricultural lands.	Recognition that Norfolk and Haldimand Counties have 141,195 acres and 246,870 acres, respectively, of Class 1 and 2 soil capability acreages combined.
3) Forestry and agricultural conflicts.	Resolution of conflicts to satisfy both land uses.	Of the original 75 percent of the land in forest in 1851 only 11 percent remains. Forest condition and productivity can be increased by protection against damage by grazing of dairy cattle in upland and wetland forest sites. Situation made more critical by fact that 8 percent of the 11 percent of land in woods contains forest ecosystems considered self-reproducing for anticipated demands in respect to recreation, forestry and wildlife management.
4) Fertility.	Fertile soils for agriculture.	Greater fertilizer applications on sandy soils where soil tests indicate the need.
5) Vegetation.	To determine opportunities and constraints of climate.	Little regional variation in transpiration and monthly rainfall during the growth season; deficiencies in sunlight and/or summer heat units is not expected to be a yield-limiting stress in the Study Area.
6) Stream pollution through careless agricultural practice.	Improvement of stream quality and environs.	Implementation of policy encouraging farmers not to cultivate closer than 50 feet from open body of water or stream and maintaining this area under permanent cover of grass or trees.

Factor	Consideration	Response
Agricultural Economy		
7) Capacity for improving agricultural productivity.	Consideration in the regional plan in comparison to other areas of Ontario.	Pre-emption of agricultural land for other uses in the long-term regional plan should recognize Norfolk-Brant-Haldimand area as having experienced agricultural growth rate, 10 percent greater than Ontario average, making it one of favored areas for improving agricultural productivity.
8) Profitable tobacco land and agricultural growth above average.	Townships with a high intensity of tobacco crop but which expanded production of other crops and livestock between 1961-66.	Policies should encourage continued expanded production of other crops and livestock in following townships: Norfolk—Middleton, North Walsingham, Charlotteville, Windham. Brant—Burford.
9) Profitable tobacco land and agricultural growth slow or negative.	Townships with a high intensity of tobacco crop but little growth between 1961-66.	Policies should be reviewed to encourage the development of livestock or other cash crops if tobacco crops decline in following townships: Norfolk—Houghton, South Walsingham, Townsend, Woodhouse; Brant—Oakland.
10) Livestock area—growth above average 1961-66.	Townships with low agricultural sales per acre and low level growth 1961-66.	Farmers in those townships have taken advantage of climatic and location factors to expand production between 1961 and 1966. Policies should encourage continued expansion on the Class 1 to 3 soils. Includes following townships: Brant—Brantford, Onondaga, South Dumfries. Haldimand—Dunn, Oneida, South Cayuga, North Cayuga, Canborough, Seneca.
11) Livestock area—growth average to below average 1961-66.	Townships with low agricultural sales per acre but high level of growth 1961-66.	Agricultural base in these townships is low and growth obtained between 1961 and 1966 was below average. Expansion should be encouraged on Class 1 to 3 soils but other uses for soil could be considered. Includes following townships: Haldimand—Rainham, Moulton, Sherbrook.

Factor	Consideration	Response
12) Tobacco rights.	Consideration of limitations.	As tobacco rights make this crop one of most profitable farming types, they may act to limit adoption of new technology involving efficiencies associated with increased size of business and thus limit entry of new areas and farms, and intensification of land use on existing farms.
13) Future of tobacco.	Adjustment to further crops in face of health campaigns, external political situation in tobacco-producing countries and extension through research of tobacco production to other areas.	Other crops such as corn, potatoes, fruits and vegetables could be grown on tobacco land but would require major adjustment program and would likely prove to be uneconomical.
14) Agriculture on Haldimand clay soil.	Improved soil management practices and consideration of other crops in long term.	Soil management problem has encouraged low-risk, dairy and beef farming; hog and poultry production can be expanded with purchased feed; new soil management techniques may make possible production of temperate zone specialized field crops.
15) Profitability in agriculture.	An analysis according to soil type.	Farming relatively profitable in Study Area where tobacco is grown; in Haldimand townships where clay soils predominate, productivity is below Ontario average. While hogs and poultry increasing in importance in Haldimand, other types of farms declining in importance except in central area around Cayuga.
16) Tobacco land.	Continued allocation in this use.	As long as demand is sufficient to require tobacco land for this purpose it should stay in this use, recognizing that because of favorable climate and location, it will provide economic advantages for the production of fruits, vegetables and specialized canning and field crops should demand for tobacco decline.
17) Long-term land use allocation of soils in Classes 1, 2, 3.	Reservation for agriculture.	While intensity of farming of this land is below potential, favorable climate and location suggests that there will be economic advantage for future demands for specialized agriculture products. This land should remain in agriculture until more detailed studies are completed to indicate future demand for specialized crops.

2/Forest Land Use

Factor	Consideration	Response
Forest Economics		
18) Timber production capability.	Classification for Study Area.	Recognition that potential for timber production in Site Region 7E, within which Study Area is located, is higher than on any other land in Ontario.
19) Timber production.	Recognition of Study Area characteristics.	Common concept of timber production on large holdings managed primarily for that purpose does not apply to Study Area. Planning concepts must recognize that timber production must take place within forested areas, both large and small, that are managed primarily for other goods and/or services but on which timber production is integrated within the concept of multiple-use forest management.
20) Soils for timber production.	Recognition of potential on different types.	While lighter soils of Norfolk County have higher potential for wood production than the Haldimand clays, revenues from natural areas on latter may be significant.
21) Southern mesophytic Carolinian forests.	Area for preservation.	As this forest class is located on a particular landform and permeable soil (Region 7E) this landform must be acquired for its preservation. Desirable to exclude large scale urban and industrial development.
22) Forest land use management.	Improved legislation and administration.	Existing county tree-cutting by-laws under the provincial Trees Act have frequently not withstood the pressures to clear land for agricultural use. This has not always provided an optimal land allocation from the viewpoint of society. A new regulatory system is required which would permit a change in land use which provides for the changing needs of the community as a whole within an acceptable welfare-cost ratio. Therefore such regulations should be sufficiently flexible to impose constraints compatible with a well-structured land-use plan.

Factor	Consideration	Response
Ecology		
23) Forest protection.	Increased forest productivity.	Forests which suffered severely from chestnut blight and which were protected from fire and grazing are now well stocked with other species that are indigenous to these sites. Similarly, forests now suffering severely from Dutch elm disease must be protected from fire, grazing, drainage and other ravages so that they too may regenerate naturally to species that are indigenous to these sites.
24) Species for forest planting.	Indigenous species.	The extensive use of exotic species such as Scots pine in combination with non-indigenous pine and several indigenous conifers indicate desperate attempts of several decades ago to control blowing sands within the Study Area. The resulting forests are out of context with the ecological and historical realities of the region. It should be recognized that existing conifer plantations have performed their soil stabilization function and should now be used as nurse crops to regenerate the areas to more valuable and more esthetically attractive native hardwoods.
25) Forest land use rationale.	Recognition of biological and social factors.	Future forest land use policy, ecological land use planning principles and non-timber forest values should be the basis of forestry programs since timber production within the Study Area is seldom profitable to the land owner in traditional economic terms. This approach should involve recognition of types of physiographic units and the potential and degree to which communities are able to use this potential. Land use adjustments should then be based upon an integrated approach recognizing the constraints of the non-living and living environments to achieve a total economic, social and biological production system.
26) Strategic multiple-use natural areas.	Designation and preservation.	Areas designated for this purpose should be reserved in the regional comprehensive plan.

Factor	Consideration	Response
27) Land capability for multiple-use natural area.	Basis.	Recognition of very strong correlation between the capabilities for timber production and capabilities for multiple-use natural areas, although there are departures from this relationship. Other basic factors include landform, water bodies, minerals, unique sites, and patterns of associations of these factors.
28) Land appraisal	Basic rationale.	Comprehensive planning should be viewed within context of provincial classification of site regions. Study Area is Site Region 7E within which are located small homogeneous areas known as physiographic site types which should be the basic units for land appraisal. Further patterns of physiographic site types (landscape units) should be used to identify and analyze biological and cultural features.
29) Port Rowan Landscape Unit.	Preservation for multiple-use natural areas.	This unit, which includes Long Point and Turkey Point, has 50 percent Class 1 capability and 50 percent Class 2 capability for use as "multiple-use natural areas". This unit is the most suitable and most important for the regulated management of intensive recreation areas; ecological reserves that include beaches, marshes and dunes; public hunting areas; and, on the remainder, residential and commercial recreation areas.

Factor	Consideration	Response
30) Multiple-use natural areas — Waterford Landscape Unit.	Preservation.	Land use policy recognizing that 100 percent of this unit has first and second rate land capability for this use.
31) Forestry — Canfield Landscape Unit.	Multiple-use natural areas.	Public ownership of blocks containing 500 acres or more.
32) Renovation of derelict land.	Encourage investment strategy.	Policy for use of public and private funds to encourage landowners to renovate deteriorated valley lands, protect grazed forest areas and reforest eroded farm lands for economic, social and ecological gains. Involves innovation of new techniques applicable to a rapidly urbanizing rural environment.
33) Environmental quality — natural environment.	Reserve and integrate large blocks of land as part of entire regional system.	Establishment of planning objectives and a program for “the best possible environment” through reservation in perpetuity of sizable blocks of natural areas having strategic value, both in quality and in location. To be achieved in part by exploring the full natural resource potential of the forests and non-farm vegetation within the context of a balanced development of the region.

3/Landscape

Factor	Consideration	Response
General		
34) Land appraisal.	A meaningful rationale within the cultural context of the Study Area.	Assessment of land <i>capability</i> for land use allocation is inadequate. Therefore the approach of <i>suitability</i> must be used to consider the degree to which land is developed or must be developed to achieve its potential capabilities.
35) Natural landscape scenario.	A planning strategy for preservation of the natural environment.	Scenario should be used as a planning tool concept which expresses hypothetical sequence of events based upon <i>urgency</i> rather than as a sequence. It is predicated upon fact that these strategic areas will cease to exist by year 2000 unless action is taken in the next few years. Legislation of State of Indiana should be carefully analyzed for its application to Ontario in respect to strategic multiple-use natural areas. Scenario for this purpose should be used to assist in planning urban expansion, rather than to impede it.
36) Natural and cultural landscape — contrast and diversity.	Preservation and articulation.	Planning objectives and supporting measures to recognize these qualities as being of prime significance in creating regional environmental quality and interest.
37) Regional interest as a basis for planning.	Recognition of diversity and contrast as major influencing factors in planning and design.	Landscape planning based upon landscape personality, Long Point being the most interesting and the clay plain landscape the least interesting. Use as a guide for future development.
38) Degree of land development.	Optimum exploitation.	Recognition that full potential for agricultural, forest and natural area land uses is not fully developed due to (a) over-abundance of land in Ontario, (b) lack of economic pressures to develop large efficient farm units, and (c) lack of social pressure to preserve and to develop natural areas.
39) Class 1 soils.	Opportunity for various uses.	Ontario loam, Brantford clay loam and Brant loam of 0-5% slopes are Class 1 for agriculture, recreation, waste disposal and urbanization. Other soil series with minor limitations are gentle slopes of Huron clay loam, Brant silt loam, Onondaga clay loam.

Factor	Consideration	Response
40) Poor soils.	Recognition of limitations.	Wet, shallow and organic soil and dry sands are poorest for agriculture, recreation, waste disposal and urbanization; include bottomland, Eastport sand, Farmington loam, Gilford loam, Granby sandy loam, muck, Plainfield sand with 6-12% slopes and Wauseon sandy loam. Should be used for ecological purposes or low intensity recreational use.
41) Strategic open-space landscapes.	Preservation.	Assignment of land for this purpose must be made in such a way that the blocks will be large and will remain inviolate.
42) General demand on use of Lake Erie shoreland.	Comprehensive rationale.	General planning and detailed development policy to integrate variety of land uses requiring shoreland orientation (see map "Site-Scale Concept for Use of Shoreland").
43) Lake Erie shore corridor.	Planning as a total unit.	Development policy emphasizing importance of estuaries and re-alignment of rights-of-way to give access to shoreline for local, regional, and Buffalo-Detroit recreational travel.
44) Landscape resource inventory.	Detailed identification at site level throughout Study Area.	Comprehensive inventory program by residents of Study Area working in cooperation with planners and supported by local and provincial government.
45) Multiple-use parklands.	Designation and protection.	Immediate restraint until methods and integrated plan of multiple land use has been prepared in order to protect quality of environmental corridors including ravines, valley slopes, bottomlands and prominent ridges, and lake headlands.
46) Techniques for control of preservation of strategic areas.	To achieve goals associated with this land use.	Use by appropriate authorities to reserve strategic areas as outlined in <i>The Niagara Escarpment Study</i> , June 1968, i.e., complete control, selective control and regulatory controls.

Factor	Consideration	Response
47) Guidelines for management of multiple-use areas	More adequate guidelines.	Concerted and integrated action on the part of Ontario and Canada government departments concerned with natural resource management on both public and private lands particularly for natural areas and ecological reserves.
48) Landscape planning expertise.	Appointment to regional staff.	Early appointment of a regional landscape architect to support, complement and implement objectives of regional planners, engineers, biologists, etc. To offer advisory services to local and provincial agencies in Study Area.
49) Natural biological systems.	Protection and restoration.	Positive strategy to be adopted immediately to restore regional ecological homeostasis; otherwise total degradation of the biological environment will result in 200 years.
50) Historical ecology.	Use as environmental bench mark for future land use, management and allocation.	Use for purposes of esthetics, water quality, recreation and scientific research and education from an understanding of natural processes and potential of the ecosystem; should be used as basis of a new management philosophy in respect to indigenous and exotic plant and animal communities and their physical base.
51) Carolinian Area of Upper Austral zone.	Use of this flora for phytogeographers, botanists and recreationists.	As flora and fauna is of nature not found anywhere else in Canada, representative areas should be acquired by public. Representative ecological associations are: 1) Deciduous forests of Charlotteville and South Walsingham Townships, 2) Sand Hills and sand dunes of Norfolk County, especially Long Point, and 3) Lake Erie marshes.
52) Ecological preserves.	Interpretation and study of natural processes.	Acquisition of complete range of physiographic environments allowed to develop with minimum human disturbance which would involve zoning techniques and non-designation on publicized land use maps. To include regional representatives of natural communities and unique species.

Factor	Consideration	Response
53) Potential ecological reserves.	Strategic importance.	Long-term regional planning should recognize potential ecological reserves made as a result of survey by Ontario Sub-Committee for the Conservation of Terrestrial Ecosystems as part of the International Biological Program of the International Union of Biological Sciences. Twenty ecological reserves have been proposed for the Study Area.
54) Oak plains ecological area.	Reconstruction.	Restoration of a sample of extensive, colorful oak plains resulting from fire management by Indians in a strip from Charlotteville to South Dumfries Townships; a distinct visual and ecological landscape. The oak savannahs should be established for ecological experimentation purposes related to environmental factor interactions and their effect on floristic and faunal composition. Relict trees such as in Lynwood Park in Simcoe and along roadsides in Charlotteville Township should be conserved.
55) Regional planting concepts.	Recognition of the intra-regional variations for economic and amenity purposes.	Climax plant communities according to physiographic features should be used as a future guide to all public and private planting schemes for maximum economic advantages and logical expression of intra-regional variation.
56) Tree species for park planting.	Resistance to adverse conditions.	Historical analyses show that species of white and burr oak are more durable than maple-beech woodlands in park forestry and open-space uses. Therefore, large scale planting practices and selective hardwood logging should favor oak regeneration.
57) Inner Long Point Bay.	Prevention of complete siltation.	Detailed studies to determine rates of deposition of the sedimentary load from lakeshore currents and Big Creek and the complete silting of the Inner Bay, in view of the importance of the Inner Bay from the recreational and ecological point of view.
58) Marshland development.	Recognition of ecological vulnerability.	Physical development for increased use should recognize ecological vulnerability and seek to prevent a change of the marshland ecology. Necessitates stringent land development controls.

Factor	Consideration	Response
59) Major swamps.	Prevention of encroachments which destroy ecological value.	Land use policies and controls to prevent encroachment by roads, excessive tree-cutting and water withdrawal and control of irrigation ponds at periphery. Controls should be extended to swamps outside Study Area which feed major streams within Area.
60) Peat bogs.	Prevent destruction.	Selection of a representative bog for preservation for interpretive and scientific values.
61) Sand Hills near Port Burwell.	Preservation for interpretive purposes.	Acquisition for public use and rigid control to preserve ecology of this unique landform.
Environmental Corridors		
62) Concentration of environmental resources.	Identification of environmental corridors and nodes.	Priority consideration in proposed development schemes of regional and local significance accompanied by development of explicit policy for their rational long-term use.
63) Major river valley corridors.	Protection from encroachment.	Bold concept of land use control to keep valley lands in permanently natural condition; to involve maintenance of agricultural or forestry zone of 1000 feet between river valley edge and nearest real estate development.
64) Lakeshore landscape between Port Dover and Port Rowan, and Big Creek and Big Otter valleys.	Preservation and land use control.	Special planning and/or acquisition of these landscapes acknowledged to be finest in southern Ontario.
Scenic Resources		
65) Environmental corridors.	Multiple-use.	Environmental corridors and similar physiographic features of high landscape value, such as ravines, pot-holes and ridge areas, should constitute a core of parks which might be managed multiple-use; to be determined in detailed planning.
66) Minor water features in plains areas.	Preservation for landscape amenity.	Planning policies and measures not only for improvement of stream water and stream bed quality but also policy for access by public in view of growing urban populations and lack of amenity in these areas.

Factor	Consideration	Response
67) Wildlife.	Landscape interest.	Originally very high populations of great variety of wildlife both large and small disappeared with forests. Establishment of large tracts of protected and managed land to enable re-establishment of original species. Research program recommended to develop management practices for increase in deer populations.
68) Shoreline bluffs.	Preservation for public use.	Acquisition of representative Lake Erie shore bluffs preferably associated with a provincial park for interpretive purposes as a unique geological process.
69) Scenic routes.	Designation.	Planning and establishment of local scenic routes by regional, local and private groups.
Climate and Atmosphere		
70) Climatic influences.	Recognition of mesometeorological variations.	Recognition of Great Lakes, river valleys, towns as regional variations, and soil type and ground cover as surface features producing meso-meteorological variations in Study Area.
71) Atmospheric resources.	Conservation for health and prevention of economic loss.	Recognition of climatic characteristics as a major aspect of regional and local planning; continued dialogue between meteorologists and regional and local planners for integration of climatic information into planning studies.
72) Photochemical pollution from lake air-inversion.	Avoidance of damage to articles in urban environment and agricultural crops.	Recognition for planning purposes that nitrogen dioxide and hydrocarbons, which are the ingredients of photochemical pollution, come from the opposite side of Lake Erie, and with additional industrial concentration in Study Area will cause more damage than that experienced in the past.
73) Forecast of future air pollution.	Simulation of regional pollution.	Development and verification of a simulation model based upon expected inventory of emission sources and strengths as a valuable tool in regional planning.

Factor	Consideration	Response
Scientific Landscapes		
74) Relict vegetational areas.	Preservation and management of more and larger relict stands.	Designation for historic sites, government preserves and university research. Management transferred from private and government agencies to ecologists working with broadly based trust board from various sectors of society. To be used for scientific purposes only, exclusive of economics. Early resolution of conflicts between government and private interests.
Non-Metallic Geological Resources		
75) Non-metallic geological resources.	Inventory and planned use.	Locate economically important deposits for efficient use in future urban expansion.
76) Bedrock resources.	Stone, natural gas.	Inventory and planned use of stone for dimension purposes and crushed form; thick surficial deposits constitute a problem in bedrock quarrying necessitating protection and planned use of this resource in southeastern Norfolk County. Important because of strategic location and unavailability of nearby gravel deposits. Natural gas is likely to play a decreasing role in the economy of the region.
77) Anhydrite and gypsum.	Inventory and planned use.	Planned use of these minerals which are only deposits worked in Ontario; a major resource for the construction industry.
78) Dolomite.	Inventory and planned use.	Planned use as this is a major source of crushed stone in Haldimand County. Same applies to medium-bedded limestone of the Bois Blanc formation which is also a major source of crushed stone in Haldimand County.
79) Gravel.	Inventory and planned use.	Detailed inventory required as reserves are low and located in the periphery of the Study Area near Paris. Also required is information regarding substitution with crushed rock near sites of future urbanization.
80) Sand.	Planned use.	Abundant sand resources in Norfolk County but Lake Warren beach sands should be mined judiciously to avoid destruction of landforms.

Factor	Consideration	Response
81) Clay.	Inventory, assessment and planned use.	Abundant clay resources in Haldimand County of suitable quality for tile and brick should be exploited for future constructional purposes.
82) Erosional pattern along Lake Erie shoreline.	Studied consideration and preservation of important land features.	As lake currents erode shorelines to form prominent landscape features of scallops and spits, detailed inventory of shoreline erosion and deposition must be undertaken. Studies must include alteration of shoreline erosion patterns by large-scale development insofar as they affect these unique landforms which include Turkey Point and Long Point and the prime beaches in this area.
83) Shoreline characteristics.	Classification.	In view of prospective construction of large structures, shoreline should be classified as to engineering characteristics of geological materials. Should include rate of retreat of bluffs as the most pressing erosional problem of the lakeshore caused by such factors as wave action, surface run-off, ground-water seepage, ice and frost action, and slumping.
Heritage Resources		
84) Historical interpretation of native people.	Appreciation of cultural history of the Study Area.	Systematic archaeological work (not as yet undertaken) and historical research to produce interpretive publication.
85) Indian village reconstruction.	Exploitation of heritage.	Reproduction of a Neutral village from its known resemblance to the pallisaded villages of the Hurons.
86) French traders and explorers.	Identification of first activities of white man in the area.	Reconstruction at Black Creek of buildings of missionaries de Casson, de Galinée.
87) Archaeology.	Interpretation of past civilizations.	Archaeological studies into remains of early white settlement.

Factor	Consideration	Response
88) Military traditions and history.	Interpretation of events and restoration of artifacts.	Historic markers and/or physical reconstruction of locations including Burford, Long Point and the Nelles of Haldimand; reconstruction of Fort Norfolk. Document events related to War of 1812 and Rebellion of 1837-38 in which region was prominent. Also, reconstruct physical features related to the conflicts and simulate by sophisticated interpretive means military events of those times.
89) Mohawk historic sites.	Concerted program for emphasizing Mohawk history since arrival of white man.	Systematic study and organization of various Indian-related artifacts such as Her Majesty's Chapel of the Mohawks, Mohawk Institute, Brant's Monument, Chiefswood, and Ohswekan Council House. Reproduction of ancient Iroquois life.
90) Loyalist life.	Interpretation.	Major reconstruction of early Loyalist life including agriculture, modes of travel, farm architecture, different periods in Loyalist history, related industries, schools. Backhouse Mill site may be nucleus for such development.
91) Cultural-political-educational affairs.	Exploitation of heritage.	Collections of work of artists, writers, politicians, educators and others of the region.
92) Historical regional growth.	Interpretation of events and related artifacts.	Systematic study of various aspects related to political, cultural, transportation and industrial development of region, e.g., plank roads, railways, canals, ports, foundries, livery stables and traveler stops, wagon and implement works, pottery works, textile mills, which are of both local and regional significance but which if integrated could form a system of pioneering activity interpretation. Consideration of regional "frontier" museum.
93) Ethnic resources.	Articulation for intra-regional interest.	Policy of encouragement of ethnic expression especially of Tuscarora Indian culture, ethnic groups of Delhi area, and United Empire Loyalist architecture.
94) Period architecture.	Cultural heritage.	Preservation and conservation of individual structures and complexes which are of regional and national significance.

Factor	Consideration	Response
15) Architectural conservation.	Preservation compatible with contemporary purposes.	Concerted policy and controls for conservation of distinctive architecture during rehabilitation and modernization.
16) Architecture—Vittoria.	Restoration of Vittoria prominent as capital of western Ontario.	Conduct feasibility and design studies to restore Vittoria as example of good early architecture including the quality buildings located there. Reconstruction of some of the old buildings and addition of many fine examples of architecture of national interest from surrounding area.
17) History and culture.	Exploitation of heritage.	Limitations and uneven success of efforts suggests fuller implementation of existing policies at all levels and adoption where necessary of new policies to protect the cultural heritage of Study Area.
Pollution, Waste Disposal and Hazards		
18) Soil capability for waste disposal.	Recognition of constraints.	Recognition of following factors affecting the soil for waste disposal: soil and site, depth of bedrock, depth to water table, slope and seepage, stoniness and trees, natural soil drainage, soil texture, soil structure.
19) Soils for sewage disposal.	Avoidance of certain soil series.	Bottomlands completely unusable due to periodic flooding. Avoid Classes 4 and 5. Use for recreational pursuits and crop production, especially pasture.
20) Waste disposal sites.	Location on soils Classes 1 and 2.	Poorly drained, shallow and organic soils and floodplains to be avoided for waste disposal.
21) Surface mine sites for refuse dumps.	Elimination of practice.	General prohibition of use of post-extractive sites for dumping of refuse without agency approval and especially where water bodies are formed to prevent contamination of aquifers.
22) Gas well capping.	Disposition of defunct wells.	Establishment of policies to cap defunct wells with or without ownership.
23) Oil seepage.	Protection of environmental resources.	Review of continuation of this hazard resulting from off-shore natural gas wells as in Lake St. Clair region.

Factor	Consideration	Response
104) Derelict buildings.	Removal of blight.	Adoption and enforcement of building and maintenance by-laws to eliminate derelict urban and rural buildings and abandoned and badly deteriorated cottages in recreation areas.
105) Erosion of Lake Erie shore.	Anticipation of implications of future erosional pattern caused by natural phenomena and manmade development.	Immediate clarification of legal ramifications of common law prohibition in respect to protection against erosion; establishment of policy to protect existing landforms at Turkey and Long Points and beaches from major industrial harbor developments.
Conservation		
106. Biological productivity of Study Area.	Exploitation of full potential.	As biological productivity, based upon soil and climate, is well above average in the scale of biological productivity for the province, planning objectives based upon compatibility and intensity of use should be designed to secure full achievement of this productivity.
107) Major criteria of regional environmental quality.	Variety and contrast.	Planning policy, management plans and regulation of resource utilization to recognize that variety and contrast in the regional environment are the most important factors contributing towards user satisfaction. This diversity must be preserved in various landscape types and articulated through the development of the cultural environment.
108) Multiple-use natural areas.	Environmental quality in the broadest sense based upon comprehensive inter-dependency characterizing a region.	Preservation and/or creation of multiple-use natural areas, non-urban in character supporting forests, marsh and other wild land vegetation as patterns of biotic ecosystems, <i>i.e.</i> , natural production systems comprised of communities of plants and animals and their non-living environment. Uses to include vegetation for soil and water conservation, natural-environment experience, ecological reserves for scientific purposes, extensive recreation, timber, wild life, waterfowl and fish production.

Factor	Consideration	Response
109) Management of multiple-use natural areas.	Integration.	Single management agency, preferably under regional government, with full decision-making and implementation powers to ensure appropriate recognition of component uses at various area levels.
110) Natural forest vegetation—Simcoe Landscape Unit.	Conservation.	Policy to conserve outstanding Carolinian flora consisting of tulip tree, magnolia, flowering dogwood, sassafrass, dwarf chestnut oak, and numerous farm woodlots in good condition.
111) Natural forest vegetation—Walsingham Landscape Unit.	Conservation.	Policy to conserve unique Carolinian flora consisting of black gum, tulip, magnolia, sassafrass, flowering dogwood and numerous others.
112) Cattle on forest floodplains.	Restrictive management practices.	Extensive grazing of largely unproductive forest pasture lands along streams has caused eutrophication, bank erosion, river bank erosion and siltation causing a derelict riverine landscape. Large-scale study is required to examine this problem from agricultural, recreational, and wildlife and amenity landscape viewpoints, with objective of establishing management policy and land use control, especially as it affects public welfare.
113) Fish kills.	Reduction.	More stringent control of dumping of chemical waste and pesticides and avoidance of agricultural land reclamation practices which endanger survival of aquatic life. Mandatory management practices on stream lands by farmers urgently required, as well as policy to balance agricultural uses with competing water-based recreation need. Residents of Study Area must be prepared to take proper share of responsibility for management of resources as they affect fish populations in Lake Erie.
114) Stream water quality—Haldimand clay.	Erosion control measures.	Character of Haldimand clay plain leads to particularly heavy sediment loads due to stream-bank erosion. Special regulatory measures required to protect stream water quality.

Factor	Consideration	Response
115) Stream water quality and stream environs.	Improvement of water quality and stream valley corridors.	Crash program by Conservation Authorities, Departments of Agriculture and Food, and Lands and Forest, and Ontario Water Resources Commission. Should include not only pollution abatement but planned acquisition of stream bank easements or outright purchase of lands. Expansion of "mini-shed" demonstration by Grand River Conservation Authority.
116) Water conservation measures.	Increased water availability and provision of aquatic environments in agricultural areas to serve agriculture, recreation, fish and wildlife production for social and economic benefit.	Stimulation of farm pond and reservoir development.
117) Inner Long Point Bay.	Elimination of continuing eutrophication and siltation.	Immediate plan of action with consideration of re-diversion of Big Creek outlet to original location to preserve social and economic benefits of those important waters.
118) Landscape debilitation through surface mining.	Preventative measures.	Industry-imposed controls to prevent landscape scarring; adoption of provincial government legislation; monitoring by Ontario Water Resources Commission or conservation authorities to prevent release of turbid wash water into streams and rivers.
119) Pre-planning surface mining operations.	Minimization of negative effects of on-going operations and post extractive appearance.	Enforcement of pre-planning and rehabilitation measures by government agencies, regional educational workshops and self-policing by industry.
120) Soil mining.	Conservation of top soil.	Provincial enabling legislation requiring construction enterprises to conserve soil and to prevent rural landowners from stripping top soil for commercial purposes without permit.
121) Erosion in construction.	Prevention of erosion on beach deposits of former Lake Warren.	Protection measures against erosion in large projects such as highway construction.
Transportation		
122) River valley crossings.	Preservation of natural environment—biotic and physical.	Highway design techniques to minimize damage to river valley as space and riverine environment in general. Avoid large cuts and use large-span structures rather than deep fills.

Factor	Consideration	Response
Countryside		
123) Countryside character.	Preservation as an important landscape value for present and future urban and rural residents of area.	Provincial enabling legislation for control of countryside development to include program of landscape preservation and improvement in respect to hedgerows, windbreaks, roadside planting, buildings and woodlots to offer visual relief, especially in plains areas of Study Area. To include subsidy and landscape extension services by Department of Agriculture.
124) Landscape plantings.	Use of indigenous species.	Public policy of encouragement and subsidy for use by private sector of outstanding and rare species of Carolinian forest, including flowering dogwood, redwood and tulip poplar, to become a unique visual experience. Should be accompanied by removal of cottage areas to re-establish public access to shoreline.
125) Lack of topographical interest.	Sensitive approaches to land development to take advantage of landform.	Planning controls to either take advantage of landform for development or to preserve it as deemed appropriate for particular development.
126) Roadside planting.	Use of indigenous species.	Re-establishment of lost tradition of planting sugar maples to form rural road canopies for strong visual experience. Public policy of encouragement and subsidy to use the valuable black walnut and numerous colorful species of the Carolinian flora. Requires resolution of problem of hedgerow destruction by provincial government agencies.
127) Black walnut plantings.	Native black walnut for amenity and economic purposes.	Planting of black walnut on certain roadsides, in woodlots, valleys, and other lands having high capability for this species has potential for significant social and economic benefits. The current planting of black walnut, on both private and public land should be increased, especially where this species is historically indigenous.

4/Recreational Land Use

Factor	Consideration	Response
Planning and Administration		
128) Provincial parks policy.	Planning to cope with increasing recreational demand at various agency levels.	Adoption of progressive policy for long-range system and site planning and for site and facilities design and maintenance, all of which are of extremely low order. Systems planning to integrate recreational needs from national to local level; development of new concepts for serving park and recreational needs, including examination of prototypes outside province.
129) Planning and operations of existing provincial parks.	Elimination of low quality recreational experience.	Intensive and progressive program of long-range comprehensive planning, site development master planning and compatible land uses, facilities and traffic design, sanitation, preservation of landscape values; to include establishment of responsibility for management of fisheries reserves.
130) Regional parks and recreation.	Elimination of overlapping services and/or filling of voids.	Development of well-defined policies, within framework of regional government, for an integrated and expanded system of park and recreation services consonant with growing and sophisticated demand. Immediate study into advantages of creating a single regional park agency recognizing distinctly different goals and objectives for distinctly different types of recreation.
131) Outdoor recreation.	Site selection based on climate characteristics.	Study Area characterized by above average sunshine and below average frequencies of periods of rain on the Lake Erie shore. Summer inversion with damping effect on convections suppresses afternoon showers along coastal strip areas favored for summer recreation, a fact which should be recognized in planning policies. Low winter night-time temperatures in Delhi, between Hagersville and Caledonia, and along Haldimand-Lincoln boundary make these preferred areas for outdoor skating rinks. Snowfall for tobogganing and skiing is a problem but the drier, extreme northern parts of the Study Area are more suitable for snow-oriented recreation; north-facing slopes of moraines with thick shelter belts should be selected to promote frost pockets and reduce evaporative losses.

Factor	Consideration	Response
132) Urban development—river valleys and waterfronts.	Avoiding mistakes of the past.	Regional policy for rehabilitation of urban encroachments upon river valleys and waterfronts such as at Brantford, Dunnville and Tillsonburg. Outright public acquisition of these prime areas ahead of anticipated urban expansion. Use Simcoe as model.
133) Urban waterfront on Lake Erie.	Exploitation of full potential.	Major urban renewal, especially at Port Dover and Port Burwell. Single out for strategic qualities for intensive urban water-oriented recreation and amusement.
134) Major water features.	Full development of recreational potential.	Lake Erie shore, Grand River and Big and Otter Creeks and their tributaries characterized by large recreational development potential. Long-range comprehensive planning and careful site planning policies and practices required to overcome recent decrease in certain kinds of recreational activity on lakeshore and to protect these environments for growing future demand.
135) Long Point.	Preservation of unique landscape.	Immediate acquisition and development as national landmark under jurisdiction of national and historic parks branch with rigid controls for interpretive education and scientific study.
136) Inland Lakes.	Public use.	Public acquisition of those lakes of sufficient size and quality due to scarcity of this water resource.
137) Fishing ports and marinas.	Improvement of standards and integration into comprehensive recreational plan.	Planning and development measures to achieve integration through planning action. Areas of prime tourist interest such as fishing ports and marinas at Dunnville, Port Dover, Port Rowan and Port Burwell.
138) Growth in camping and trailering.	Site development standards.	Establishment of authority and resources to deal with environmental health and site development problems generated by growing popularity of these activities.
139) Grand River for recreation.	Re-assessment of potential in view of pending regional growth.	Re-examination of 1968 Economic Feasibility Study of Department of Tourism and Information for establishment of recreational waterway between Port Maitland and Newport.

Factor	Consideration	Response
140) Old Welland feeder canal.	Use for recreation.	Feasibility study of restoration of this historic waterway with prime recreational potential.
141) Private sector in recreational industry.	Up-grading to meet future demand.	Comprehensive study to assess quality and quantity of recreational services rendered; exploration of government assistance program in financing advisory services, integration into regional recreational system and improved welcoming system.
142) Abandoned railways.	Acquisition of rights-of-way for recreational purposes.	Immediate study into disposition of railway rights-of-way with view to establish an arrangement between provincial government and railway companies for government to receive first option of purchase.
Parks and Parkways		
143) Lake Erie shoreland acquisition.	Increase in public lands inventory.	Immediately accelerated shoreland acquisition as announced in policy of Speech from the Throne, 1962. Top priority in view of pending regional expansion.
144) Oak Plains Park.	Reconstruction as a dominant landscape feature.	Establishment on trial basis 300-acre block including 500-foot scenic historic parkway with re-introduction of original species such as wild turkey, quail, deer, beaver, otter, elk, etc. Locate near Turkey Point to take advantage of existing environment.
145) Regional parkway network.	Exploitation of natural and cultural landscape for recreational purposes.	Comprehensive study of pleasure routes in southern Ontario with view of establishment of "Lake Erie Shore Parkway" beginning with St. Clair Parkway at Sarnia to connect with Niagara Escarpment Scenic Drive and Niagara River Scenic Drive. Study feasibility of circular intra-regional parkway following Big Creek from Port Royal north to meet Whiteman Creek, then from Brantford to Port Maitland. Consideration of legislation to create "special park district" as means of preserving land compatible with this use.

Factor	Consideration	Response
146) Soil capability for recreation.	Recognition of constraints.	Use capability classification for evaluation of trafficability, erosion potential, compaction and flooding hazard for recreation areas. Applies to fairly intensive recreation activities.
147) Parkway route location.	Areas of highest scenic value.	Location along concession lines characterized by forest areas. Sensitive landscape design to ensure perpetuation of existing values and land use compatibility.

Multiple-Use Recreational Areas

148) Multiple-use parklands.	Recognition of role.	Planning recognition as a category intermediate between natural areas and intensive-use parks which are physiographically of a nature which makes them susceptible to urban sprawl. Should hold residential and industrial development until detailed plan is prepared.
149) Distance to environmental corridors.	Close proximity.	Greater pressures on land combined with the increased population will make it impossible for area residents to seek primarily day use recreation outside the region, placing greater planning credibility on reservation of these resources for recreational use.
150) Role of natural vegetation in recreation.	Recognition of semi-natural and cultural ecosystems.	Recreation being classed generally into the impact categories will require planning and management for (a) natural-area plans with very low-density trespass population, and (b) multiple-use park management for higher recreation populations though generally low compared with urban density.

Factor	Consideration	Response
Cottages and Country Residences		
151) Local sanitation problems.	Anticipation of environmental health problems in respect to water and sewage where developments take place ahead of official plans.	Regional development committee composed of appropriate provincial government departments and local officials to establish planning and control procedures for assurance of environmental health in urban and cottage planning and construction.
152) Cottage development.	Integrated planning, re-development and control.	Immediate comprehensive study of cottaging problem on lakeshore. Program of relocation of cottages from prime shoreland sites which should be acquired for public use; development and strict enforcement of maintenance and occupancy by-laws especially in regard to water and sewage and year-round residency.
153) Cottage area planning.	Nucleation.	Provincial and local site planning, design and location controls to prevent sprawl and accompanying problems.
154) Cottages within existing provincial parks.	Elimination of incompatibility.	Program of pre-emption or re-location of cottages and year-round residences; prohibition of further cottage developments in prime areas contiguous to existing provincial parks.
155) Country residences.	Establishment of location and lot size.	Zoning measures recognizing prime agricultural, multiple-resource use areas and preservation of countryside.

5/Transportation, Communications and Utilities

Factor	Consideration	Response
156) Transportation location.	Avoidance of climatic disadvantages for major facilities.	Avoid major traffic arteries and airports in snowbelt in center part of two counties; avoid Grand River valley and strip within a mile of Lake Erie because of fog. Major east-west traffic artery should be located on a Hagersville-Delhi line.
157) Airport location.	Stable soils.	Recommended major airport location on Norfolk sand plain not too close to fog influence of lake and outside snowbelt.
158) Major highway route location.	Minimization of damage to and pre-emption of valuable environmental resources.	Major trans-regional expressway should circumvent the biologically rich valleys and plains of Norfolk and east Elgin Counties and clay farmlands of Haldimand County.
159) Utility-transportation corridors.	Increased efficiency and preservation of land-based resources including amenity.	Detailed and comprehensive interdisciplinary study of concepts and techniques for establishment of utility and transportation corridors. Avoidance of integrated concepts until visual and functional problems can be solved. Employment of detailed landscape design techniques.
160) Route selection.	Avoidance of destruction of urban quality.	Routing new highways around urban centers as to minimize local environmental damage and to allow for future rational expansion of these urban areas, in relation to the changed highway routing.
161) Road and highway design and improvement.	Recognition of pleasure driving as most popular recreational activity.	Integrated policy of road development from provincial to local agencies to design roads for pleasure as well as utility. To include policies for existing and future roads in respect to tree planting, roadside rest and picnic areas, viewpoints, screening of junkyards, highway safety, etc.

Factor	Consideration	Response
162) Rapid transit type.	Low pollution-producing facilities.	Summer oxidant problem originating from the south shore of Lake Erie, which is not expected to decrease, suggests that with increased industrial development pollution-free rapid transit systems should be included in long term plans.
163) Automobile atmospheric pollution.	Reduction of summer oxidant problems.	Discourage large concentrations of automobiles through regional planning.
164) Design techniques and controls.	Full exploitation to achieve maximum environmental quality.	Use of architectural and landscape planning expertise at planning and project execution stages in respect to routes, structures, compatible uses and esthetics to achieve efficient and attractive objectives in urban and rural landscapes.

Factor	Consideration	Response
Soil and Landscape Factors		
65) Soil capability for urbanization.	Recognition of constraints.	Following factors must be recognized: depth of bedrock, depth of water table, slope, stoniness, drainage, texture, structure, and impermeable layers.
66) Soil suitability for urban and industrial uses.	Understanding of physical properties.	Use general judgment approach based on experience and other soils pending an engineering classification. Need to classify for permeability and percolation, bearing strength, shrinkage and swelling characteristics, erosion potential, etc.
67) Landscape suitability for urbanization.	Selection of sites as to cause minimum damage to land-based resources and regional ecological system.	Use approach of compromise between efficient but uninteresting sites and those less efficient but more interesting. Also, avoid areas of high-interest natural and countryside scenery.
68) Soil suitability in Norfolk and Brant Counties.	Consideration of coarse-textured sand soils.	Large areas well suited to most urban development because of rapid transmission of water, easy compaction and lower shrinkage. Easy excavation, good base for roads and parking lots, good drainage for basements and septic tanks and no settlement of structures.
69) Soil suitability for urban use in Oneida and Oakland Townships.	Consideration of characteristics of silts and loams in these areas.	Satisfactory where sand or gravel substratum exists but inferior to coarser soils. Some frost boils occur on roads; preventative drainage therefore required.
70) Haldimand, Brant and eastern portion of Norfolk Counties for urban soil suitability.	Fine-textured soils.	Bearing strength good when dry but poor when wet. Slow water movement impedes construction time; drains required for sub-base of roads; shrinking and swelling present water-proofing problems in basements. Soils poor for septic tank effluent disposal.
71) Rock formation and urban construction.	Avoidance.	Avoid areas where rock is within 4 feet of surface because of increased cost of underground services.
72) Soils investigations for urban use.	Investigation at local level.	Soils of region are generally adapted to large-scale urban development and no serious problems, other than wetness of clay soils, have appeared from engineering point of view. However, due to local soil variations, building complexes should be preceded by foundation investigation by experienced soils engineers.

Factor	Consideration	Response
173) Soil wetness or drainage.	Avoidance for certain land uses.	Wet soils requiring drainage are a greater limiting factor for recreation, waste disposal, and urbanization than for agriculture and should be avoided for these uses; artificial drainage is possible but more sophisticated systems and costlier upkeep are required.
174) Soil analysis prior to urban building.	Avoidance of costly construction without knowledge of soils characteristics.	Measures to prohibit construction of subdivisions or other building projects without detailed soil survey.
175) Soil management during building.	Maintenance of soil structure during construction.	Urban building contractors should avoid working clay soils when wet, as this results in destruction of soil structure and difficulty in creating and maintaining planted landscapes at efficient cost levels.
176) Fertility.	Fertile soils for urban uses.	Greater fertilizer applications on sandy soils of coarse textures for all urban landscapes.

Climatic and Atmospheric Factors

177) Seasonal lake inversions.	Avoidance of damage.	Spring and summer lake inversions will create problems for agricultural interests, for at these times of year vegetation is most susceptible to air pollution damage. Planning models should be based on the separation of heavy industrial zones along the lake-shore from residential areas by sectors about 8-10 miles in radius; land uses within these sectors may be gradually converted from agriculture to light industrial use. Additionally, a greenbelt one-half mile in width is recommended for purposes of air filtration and additional space for dispersal of pollution.
178) Location of heavy industry.	Determination of location of industry in relation to other land uses.	A regional plan should recognize fundamental principle that heavy industry should not be located in a large urban area.
179) Industrial location.	Atmospheric advantage.	Nanticoke area preferred for heavy industry, with discouragement in Port Maitland-Dunnville area and eastern end of Study Area on lakeshore.

Factor	Consideration	Response
180) Human comfort.	Climatically comfortable residential and working locations.	Using summer sunshine and temperature as indices, it appears that regional differences are insufficient to be important as a location factor. Principle atmospheric stress on humans in the Study Area is heat.
181) Large urban development.	Location based on climatic-atmospheric pollution factors.	Dispersion of industrial pollution in Nanticoke area is west to northwest. Based on various meteorological factors, large urban development to the north and northwest of Nanticoke would be preferred.
182) Urban meteorology.	Recognition for urban-industrial development.	Apart from problems of air inversion which may result from physiographic features, potential heat islands and concomitant air pollution may result from urban concentrations and a few high pollution-emitting chimneys.
183) Location of residential development.	Avoidance of areas of relatively high pollution potential.	Overnight cold pockets in the vicinity of Delhi, northeast of Canborough and between Hagersville and Caledonia indicate these areas have relatively high pollution potential from ground-level sources such as automobile exhausts. Preferred sites therefore are in the vicinity of Hagersville or along Lake Erie shore and at least 10 miles from heavy industry.
184) Heat-stress and wind-chill wind roses.	Optimum physical arrangement and orientation for residential areas.	Land should be open to southwest and west to promote summer ventilation, but closed by shelter belts to the north to reduce wind-chill.
185) Wind directions.	Recognition of wind direction for site development purposes.	Building complexes or large urban developments should recognize prevailing wind conditions associated with other weather phenomena to achieve greatest human comfort, and lower building and site maintenance costs.
186) Winter climate.	Recognition of intra-regional differences.	Future regional planning should recognize that in the area bounded by Simcoe, Port Dover and Hagersville temperatures are up to 10° warmer than those in the Glen Meyer-Caledonia East-Grand River valley area.

Factor	Consideration	Response
187) Mesometeorological lake air inversions.	For urban, industrial location.	Further detailed studies to better describe this phenomenon along lake-shore due to variation of distance from shoreline from place to place.
188) Additional meteorological information.	For existing and future urban and industrial growth.	Vertical soundings of temperature for lake-caused inversions to reveal information for use directly by engineers or meteorologists for chimney height design; follow-up study of modifications in local weather caused by urban and industrial growth as a matter of international importance.
Planning and Design		
189) Industrial use of shorelands.	Limitation on use for this purpose.	As lakeshore is a diminishing resource for greatly increasing populations in hinterland of region, definite limit to be placed on industrial location on shore. Also, establishment of policy of preventing industry not requiring servicing from the lake by water transportation to locate on shoreland.
190) Residential development along Grand River.	Preservation of river corridor for natural multiple-use.	Immediate planning policy to prevent establishment of residential subdivisions and growing number of single residences.
191) Strip development.	Improved countryside environment and greater efficiencies in servicing residential and commercial development.	Planning measures to restrict strip development, such as at Waterford, to enhance natural quality of entrances and to control billboards both inside and outside urban areas.
192) River front industries.	Restoration of water-oriented river values.	Long-range policy of industrial re-location for creation of river front civic spaces for improvement of downtown environmental quality. Same would apply to commercial and residential development. Emphasis on creation of continuous open space.
193) Architectural and landscape siting and design.	Treatment sympathetic with local physiography.	Enabling provincial legislation for review of architectural and landscape design of large industrial, urban and rural indoor food production units, particularly in the plains landscapes.

Factor	Consideration	Response
Supply and Demand		
194) Regional water.	Identification of regimen and inventory of supply.	Thorough understanding for regional planning and development purposes of peak flows for flood prediction and damage estimation, and of low flows for water supply and sewage dilution purposes and forecasting of storage for water supply and recreation needs.
195) Major new urban regional location —water availability.	Broad and efficient system.	Based on water availability, urban expansion should be in Simcoe, Port Dover and Jarvis, where existing systems may be expanded to form part of regional urban water distribution system based upon Ontario Hydro water intake at Nanticoke with quality water from Lake Erie. System should be joined by aqueduct to Kitchener-Waterloo-Brantford area if economically feasible. No distribution to rural areas due to high costs. Distribution to be controlled by Ontario Water Resources Commission or regional public utility body replacing individual local utility management.
196) Urban water use.	Accurate estimation of future demand.	The common method presently used to evaluate urban water use based primarily on per capita consumption must overcome the built-in disadvantages of not taking into account influences from future technological and social changes related to water demand.
197) Groundwater supply.	High quality and sufficient quantity for settlement.	Groundwater supply as a determining factor in land use. Sand areas of Norfolk County produce adequate water of good quality, while in Haldimand County the clay surface soil gives low yields of poor quality water that is highly mineralized and contaminated by hydrogen sulphide as a result of natural gas in the area. Good quality groundwater in northern Brant County but not in the southern portions. Program of reservoir development would be needed to take advantage of surface water.

Factor	Consideration	Response
198) Agricultural water needs.	Planning for future demand.	Future regional planning should recognize that while agriculture is the greatest user of water today, that use—for rural homes, irrigation, spraying and transplanting—will remain at current levels. Additional sources of water will be required for anticipated expansion of livestock industry.
Quality		
199) Regional water quality.	Dramatic improvement required.	Mandatory and sound soil and water conservation practices including turfing, reforestation, bank stabilization, flood and flow control to be instituted immediately on all watersheds in Haldimand and Norfolk Counties including tributaries in Oxford, Brant and Wellington Counties to reduce runoff, erosion, siltation, nutrient enrichment, and to achieve distribution of seasonal waterflow, and to improve availability and quality of surface waters.
200) Norfolk County watersheds as a surface water resource.	Protection.	Special planning and management recognition to the watersheds of Norfolk County and Otter Creek watershed of Elgin County, a regional “oasis” of Ontario surface waters are a critical resource.
201) Water quality in Grand River.	Immediate improvement required.	Immediate steps to improve water quality in Grand River, not only in Study Area but in entire watershed; to include suspended soils, nutrient levels and heavy metals.
202) Water quality of Study Area.	Continuous monitoring.	Frequent monitoring at critical locations for existing and new sources of pollution; to include analysis of chemical residues in fish tissues.

Factor	Consideration	Response
Pollution and Treatment		
203) Water services and anti-pollution centers.	Pre-planning and construction of facilities.	Construction prior to expanded urban and industrial development with interim developments integrated into future large-scale utility network. Municipal and industrial sewage plants should provide secondary and tertiary treatment.
204) Livestock industry.	Water supply and prevention of pollution.	Planning for substantial amounts of dependable good quality water and protection against surface water and groundwater pollution in view of prospects of large livestock production units.
205) Pollution discharge into Lake Erie and watershed in Study Area.	Improvement in water quality.	Establishment and enforcement of rigid controls on agricultural water use and quality requirements for waste water, sewage, and storm sewer effluents discharged into water bodies, especially since most communities already have sewage treatment and effluent discharge problems.
206) Waste dilution.	Maintenance of stream water quality.	As urban water supply, fish, wildlife and recreation are incompatible with waste dilution as uses for streams, a program is needed to expand existing anti-pollution centers where current need exists and to build new centers for future needs.
207) Thermal, chemical and physical pollution of Lake Erie on-shore waters.	Maintenance and/or improvement of aquatic environment resources.	No discharge into Lake Erie of effluents which may cause significant change in water quality or thermal regime in on-shore waters resulting in irreversible effects on major commercial and sport fish, impairment of domestic water supply, and creation of serious social and public health problems.
208) Enrichment of Inner Long Point Bay and Lake Erie in Norfolk County.	Improvement of water quality and avoidance of siltation and local eutrophication.	Expansion of sewage treatment facilities at Port Dover and Port Rowan; enrichment of Inner Long Point Bay at Port Rowan is critical.
209) Solid waste disposal.	Improved sites to avoid surface and underground water pollution.	Closing of most, if not all, existing refuse dumps and establishment of new dumps to meet rigid health and pollution standards designed to avoid leaching of organic chemicals or toxic wastes into natural water courses for groundwater.

Factor	Consideration	Response
210) Solid waste disposal.	Regional program.	Regional planning policy to dispose of solid waste without contaminating surface and groundwater supplies and regional air shed. Should be preceded by studies of tolerance of particular soil and geological formations and surface mine pits to absorb this type of waste.
Management		
211) Water management practice.	Coordinate policy involving all levels of government and their agencies.	To eliminate the severe conflict between policies of government agencies, landowners and general public needs, an immediate comprehensive review of legislation, policy and practices is required. This involves water management for agriculture, timber production, recreation, scientific purposes, and construction of water reservoirs for maintenance of stream flows and creation of amenity. Certain soils should not be drained.
212) Water use conflicts.	Planning to meet all social and economic needs.	Hydrological research in water resource planning to resolve severe existing and increased future conflicts between recreational, urban and agricultural demands and water for forestry, ecological and landscape purposes.
213) Intra-regional precipitation variation.	Forecast of hazards and needs.	Study of non-uniform distribution of precipitation from storms with local effects to assess potential flood hazards and drought problems for forecasting regional water needs.
214) Lake level fluctuations.	Reduction of damage.	Planning should recognize that high lake levels cause serious erosion problems and damage to retaining walls, docks and beaches.
215) Low stream flow.	Water supply and sewage disposal.	Special study of low-flow duration curves to give frequency of occurrence for purposes of sewage dilution and supplying water demands for irrigation, municipal water supply, recreation, etc.

Factor	Consideration	Response
216) Stream flow.	Maintenance of uniform stream flow.	Retain swamps for water retention capabilities including Burford, Oakland and Canborough swamps for base flow of Big Creek, McKenzie Creek, and Oswego Creek respectively; also as natural reserves for maintenance of present ecology.
217) Water quality in Norfolk County.	Improvement of water quality resulting from damaging agricultural practices, including indiscriminate use of surface waters for irrigation, encroachment of cultivated land on water courses causing erosion, and heavy use of pesticides and fertilizers.	Appropriate legislation for land use control and soil and water management rigidly enforced in intensively cultivated areas; to include compulsory grass and/or wooded corridors of stream-lands along cultivated areas. Protection of water courses and river beds from physical alteration by permit control. Re-evaluation of allowable limits and water withdrawal for irrigation, now grossly excessive.
218) Water supply and effective sewage treatment for lower Lynn River watershed and all of Haldimand County west of Grand River.	Integrated water supply and sewage network should precede further urban or industrial development to overcome existing sources of pollution of aquatic environment.	Planning policy of no further industrial and commercial development until adequate water supply is made available and effective sewage and waste water treatment facilities are established. Regional water supply for agriculture as well as urban industrial needs.
219) Inadequate water supply in Haldimand County east of Grand River.	Solution to water supply and pollution problems in event of increased settlement.	Designation as no-development zone pending solution to these problems.
220) Industrial water cost.	Equitable cost sharing.	Rate structure based on capital cost and use of facilities rather than upon political considerations.
221) Groundwater.	Control of use.	Control by Ontario Water Resources Commission to maintain existing static levels and prevention of groundwater pollution.
222) Drought.	Water supply adjustment according to local variations of water supply.	A regional drought probability study especially for irrigation planning, as well as other uses.
223) Agricultural drainage.	Elimination of drainage hazard.	Drainage must be undertaken to improve agricultural prosperity of both counties. Program of major drainage outlet construction is required in Haldimand County for improvement and up-grading of agriculture.

Factor	Consideration	Response
224) Discharged cooling water from Nanticoke generating station.	Exploration of potential uses of discharged cooling water.	Thorough investigation of use for domestic, agricultural and industrial requirements of Haldimand County and eastern limits of Norfolk County; to involve esthetic and recreational potential. Consider approach of pumping water into Nanticoke Creek and Lynn River watersheds to create reservoirs and connecting waters achieving dissipation of heat as well.
225) Regional water supply.	Regional water distribution system.	Distribution system for the middle Grand Region and Haldimand County west of the Grand River.
226) Water supply and demand and sewage treatment.	Amalgamation on regional scale.	Amalgamation of services to control both operation of water and sewage needs on a regional basis in view of prospects of increased water demand, and limited groundwater supply in relation to demand and limited stream capacity to absorb effluents. Involves collection, treatment, distribution of both water and sewage. Program best achieved through control of actual operations by single agency, preferably Ontario Water Resources Commission.

Factor	Consideration	Response
General		
227) Detrimental and permanent effects of man-originated activity on fisheries and wildlife habitat.	No-development belts.	Planning measures to prevent development of scenic and faunally rich valleys of Norfolk County as a general conservation practice for wildlife production, public hunting and fishing and esthetic and recreational purposes.
228) Unique flora, faunal and ecological features.	Preservation in perpetuity.	Immediate steps for preservation of Long Point and Lake Erie marshes, all of Long Point adjacent farmlands, and forelands of Norfolk County. Plan to include wilderness areas, sanctuaries, waterfowl breeding and nesting areas, spawning grounds for warmwater fish, public hunting for waterfowl and upland game species.
229) Fish and wildlife management policy.	Prevention of destruction of habitats.	Immediate review of existing government policies relating to drainage of wetlands and destruction of fence rows subsidized by public funds. Resolution of conflicting land management policies by government departments in respect to multiple-use of land.
230) Wildlife damage by agricultural chemicals.	Further information.	High priority for thorough study of extent of present and potential damage from use of agricultural chemicals in Norfolk County and various industrial effluents; appraisal of present chemical residue levels in wildlife to determine welfare of species and threat to human health.
231) Quality of Grand River water.	Elimination of pollution by accepted criteria, i.e., chemical and physical characteristics of organic load, resident flora and fauna, etc.	Elimination of effluents entering the river not only from Brantford but significant sources of pollution upriver keeping water perpetually turbid and enriched throughout the Study Area. While there is no significant pollution from a number of river communities without waste treatment at present population levels, future problems must be anticipated as population increases aggravate current pollution problem and lead to degrading of aquatic environment to exclusion of present fish, wildlife and recreational and esthetic uses.

Factor	Consideration	Response
232) Assessment and monitoring of quality of aquatic environment in Study Area.	Elimination of existing sources of mechanical, chemical and biological pollution and further prevention of deterioration of natural waters.	Continuous monitoring system including much greater emphasis of toxicity levels of heavy metals and agricultural and industrial chemicals on welfare of fish species and their quality for human consumption.
Animal		
233) Preservation of and access to faunal areas.	Assurance through long-term planning and development.	Planning to control woodlands, wetlands and idle lands on regional basis to perpetuate terrestrial fauna by control of future rural and urban development and to allow public access for naturalists, hunting, general outdoor recreation purposes.
234) Wildlife.	Wildlife management for social and economic advantages.	Establishment of a regional, integrated wildlife plan to prevent continuing alteration and destruction of aquatic and terrestrial environment and ecosystems essential for native resident and migratory fauna. Plan for intensive wildlife, fisheries and multi-purpose use recommended on selected tracts to be purchased for this purpose.
235) Estuarial marsh at Grand River.	Prevention of further industrial encroachment.	Immediate action through government acquisition of marshes for migratory waterfowl and for local production.
Fisheries		
236) Water policy for fisheries and wildlife.	Improved water management.	Immediate review of government policy on irrigation and streamwater withdrawal and on use of stream bed by construction of water-holding ponds within water course. Urgent and immediate action in Norfolk County.
237) Coldwater fisheries.	Integrated coldwater fish management plan Norfolk County, Bayham Township in east Elgin County and southern part of Oxford County including Big and Little Otter Creeks, Clear Creek, Big Creek, Dedrick Creek, Young Creek, headwaters of Lynn River and some watersheds in Charlotteville Township.	Importance and uniqueness of the coldwater fisheries in this part of Ontario makes necessary an integrated coldwater fish management plan based upon comprehensive inventory of aquatic environment and present and potential fisheries; also future land and water management policy for preservation and improvement of water resources and fish management procedures to include portions of lands contiguous to these water bodies and integration with objectives of use of this land for various other multiple purposes.

Factor	Consideration	Response
238) Standards of water and environmental quality.	Prevention of deterioration of fisheries in Lake Erie fronting Haldimand and Norfolk Counties including Long Point Bay and the lower Grand River.	Intensified research to assess ecological requirements of both sport and commercial fisheries to prevent deterioration by urban and industrial development.
239) Salmonid fisheries of Norfolk County.	Maintenance of important sport fishery.	Improved and corrective management procedures for upgrading environmental conditions to increase production and use for optimum social and economic benefit. To be achieved by protecting environment and eliminating pollution of agricultural and urban origin, combined with immediate research program on biology of trout species and ecological requirements as related to stream environment of Study Area. Regional resource planning should focus on excessive withdrawal of water for irrigation, drainage of wetlands, and soil conservation practices along water courses.
240) Commercial and sport fisheries on Lake Erie fronting Haldimand County.	Preservation of water environment for important economic and social use of water.	Protection of shoal areas for reproduction and growth of commercial and sport fish against damaging environmental effects, especially discharge of effluents into the littoral zone of the lake which differ or are of inferior quality to that of local Lake Erie water; areas include the Outer and Inner Long Point Bays. Water management measures should include prevention of filling up through siltation of the Inner Bay which is currently taking place.
241) Watershed management in Haldimand County.	Dramatic improvement in water quality.	Deplorable conditions in watersheds make essential a large-scale planning and management restoration program. Requires extensive water and soil conservation program. Use of discharge water from Nanticoke electricity generation plant should be considered in development of water management plan for western Haldimand County and eastern limits of Norfolk County.

Factor	Consideration	Response
242) Grand River for fisheries.	High standards of water quality.	Detailed study of lower Grand River to assess parameters of present fisheries resources and identify adverse environmental conditions and their origins, with pollution abatement as a prime objective.
243) Fishing for leisure.	Meet demands of increased leisure time and use full potential of Lake Erie fisheries resources.	Planning and development program to increase public access to Lake Erie with construction of boat launching ramps especially in protective bays, at river mouths and in areas of Turkey Point, Inner Long Point Bay and lower Grand River. A program to erect fishing platforms or piers wherever necessary along entire lakeshore especially in areas of prime fishing, also where access difficult as in Norfolk County.
244) Fish quality for consumption.	Maintenance of present fishing levels, increased opportunity and confidence in edibility.	Concerted program in Study Area by agencies responsible for fisheries to maintain an information program as to suitability of fish for consumption as affected by pesticide and other chemical residues in fish.

Dividing the Study Area into Zones for Consultation Purposes

- 1) Early in the course of the Study a need was found to subdivide the Study Area to assist in the preparation of policies for specific localities. As both evaluation and characteristic maps were to be considered in any formulation of policy, it seemed appropriate to use these as a basis for drawing zone boundaries. It was found, however, that policies were likely to be determined by the evaluation of a particular zone by different interests rather than by the characteristics of the zone.
- 2) Zones were compiled from overlays of agricultural, wildlife, and landscape evaluations (Maps 12-4, 12-7 and 12-9). Although a forestry evaluation map was not prepared, use has been made of the distinction between managed and unmanaged woodland.
- 3) Boundaries were adjusted (by movements of less than one-half kilometer), to relate them, where possible, to surface features—roads, rivers, definable woodland boundaries. Areas of less than one kilometer square were absorbed in adjacent zones of nearest value, and a comprehensive “code of working” for the adjustment of boundaries was compiled.
- 4) To test the acceptability of particular activities in each of the zones, representatives of the five main interests to be considered in policy making—landscape, agriculture, forestry, wildlife conservation and recreation—were asked to give, for each zone or combination of zones, their reaction to 49 different uses and activities, at large and small scale.
- 5) Degrees of acceptability, expressed on a five-point scale ranging from “desirable” to “unacceptable” were given, on a prepared form, from the viewpoint of each interest alone. Reasons for the choice of reaction in terms of the particular features of each zone were added, together with any management or locational conditions on which the choice depended. Each interest was free to give reactions to any activities not actually listed, and to make other comments relevant to zones,

or to the Study Area as a whole.

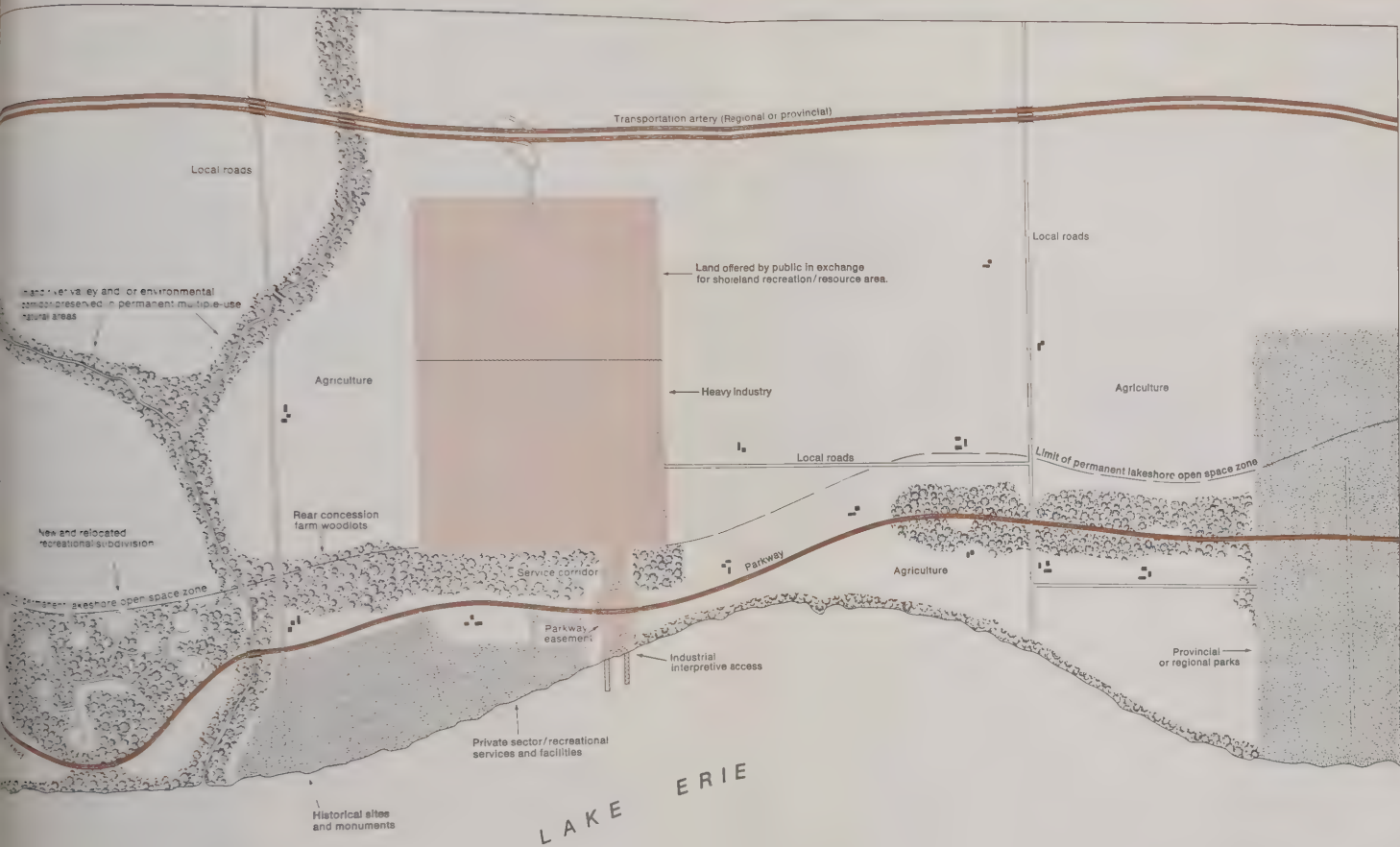
- 6) At this stage, some zones were further modified by particular interests on the basis of characteristics not included in the initial zoning or by improvements in the definition of boundaries, so that the final map contained 136 zones.

- 7) In order to simplify the handling of the data, the returns on each of the forms were transferred to a composite chart to show, for each zone, the list of acceptability values for each activity from each viewpoint.

- 8) From this, the reaction to each activity, expressed on a five-point scale from one (*i.e.*, desirable) to five (*i.e.*, unacceptable), has been determined. It has been possible to identify some zones where some interests objected, and others where the activity was unacceptable to all interests. The process shows that a direct relationship exists between the evaluation map records and the reaction of a given point of view to a specified activity. A further result of the process has been to indicate the possible forms of use and management control that might be necessary to safeguard the interests of other resources and activities in any particular area.

¹*East Hampshire Area of Outstanding Natural Beauty: A Study in Countryside Conservation.* Hampshire County Council, Countryside Commission, Nature Conservancy, Ministry of Agriculture, Forestry Commission, October, 1968.





Site Scale Concept for
Use of Shoreland



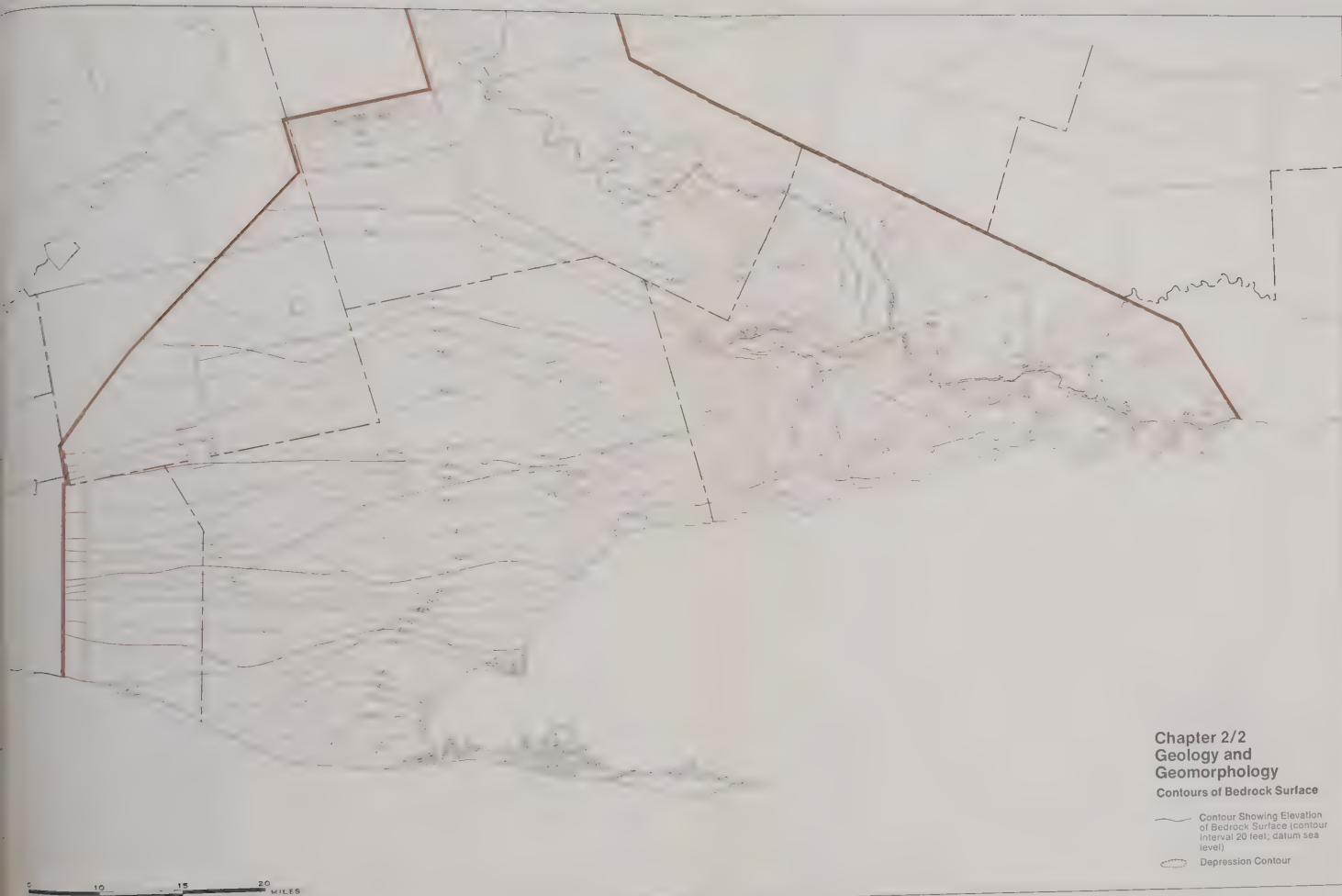
Chapter 2/1
Geology and
Geomorphology
Bedrock Geology

Devonian

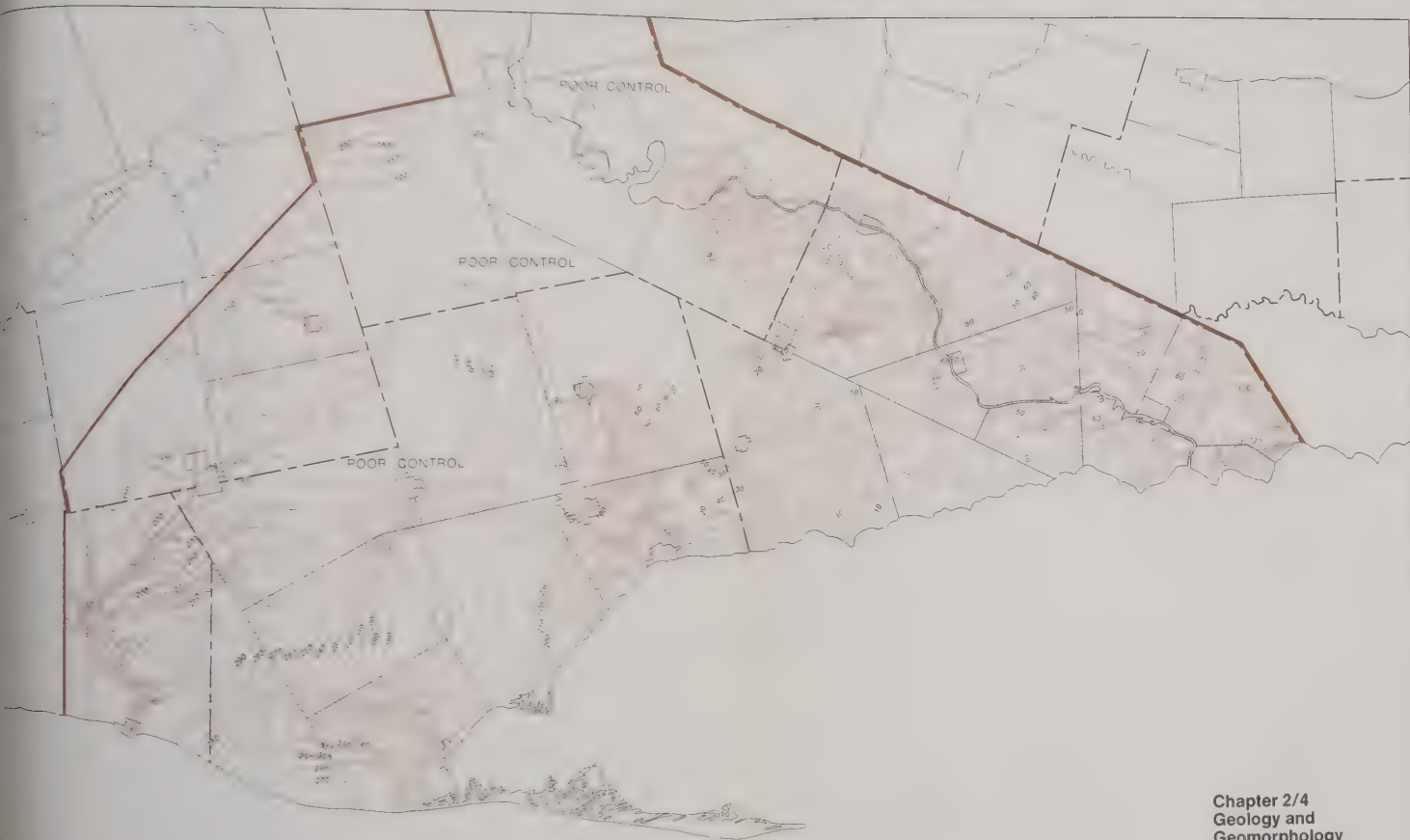
- Norfolk Formation
- Columbus Formation
(subsurface in some gas wells)
- Detroit River Group
- Bois Blanc Formation
- Oniskany Formation

Silurian

- Bentley-Akron Formation
(Bass Island)
- Salina Formation
- Guelph Formation





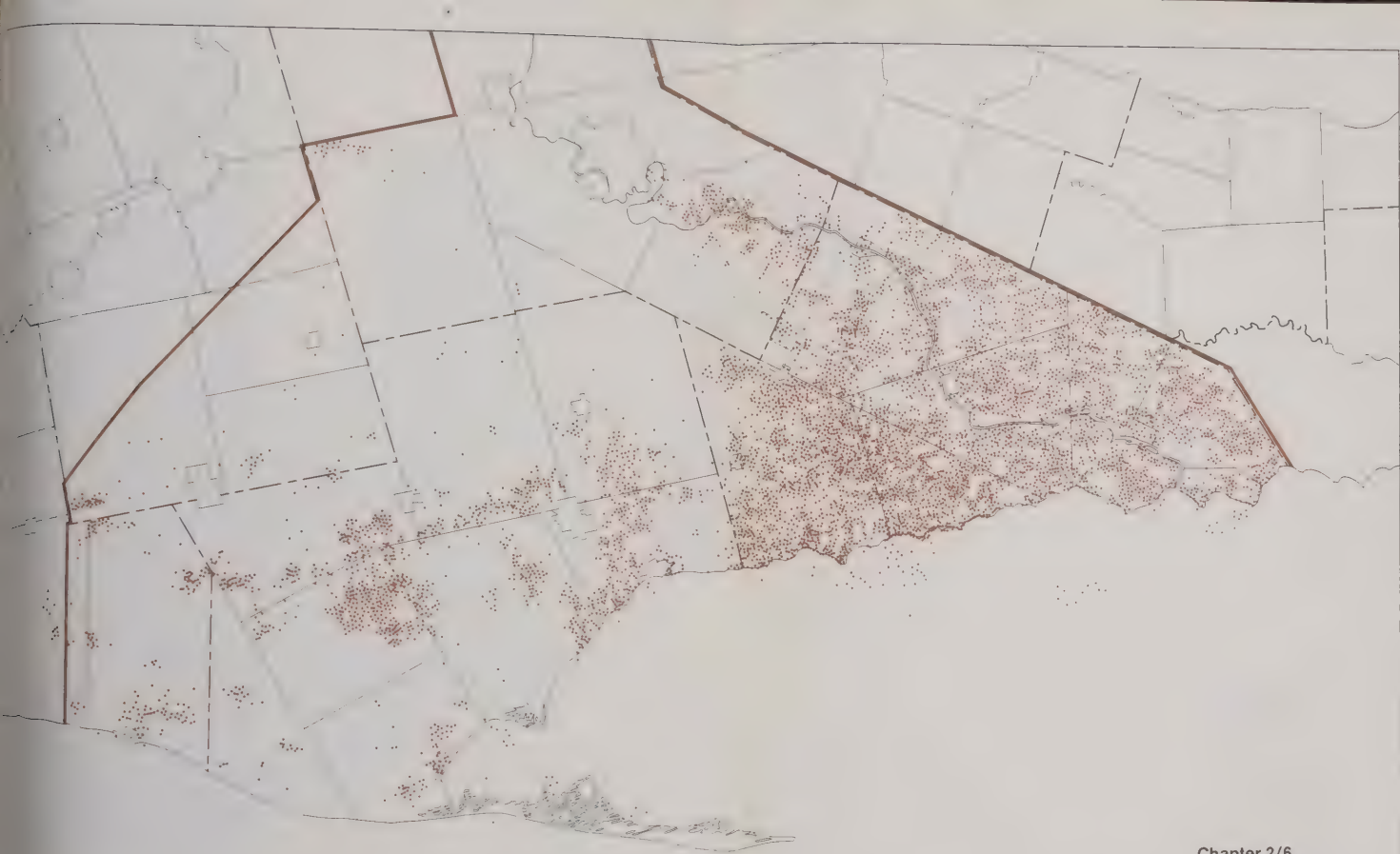


Chapter 2/4
Geology and
Geomorphology
Contour of
Drift Thickness

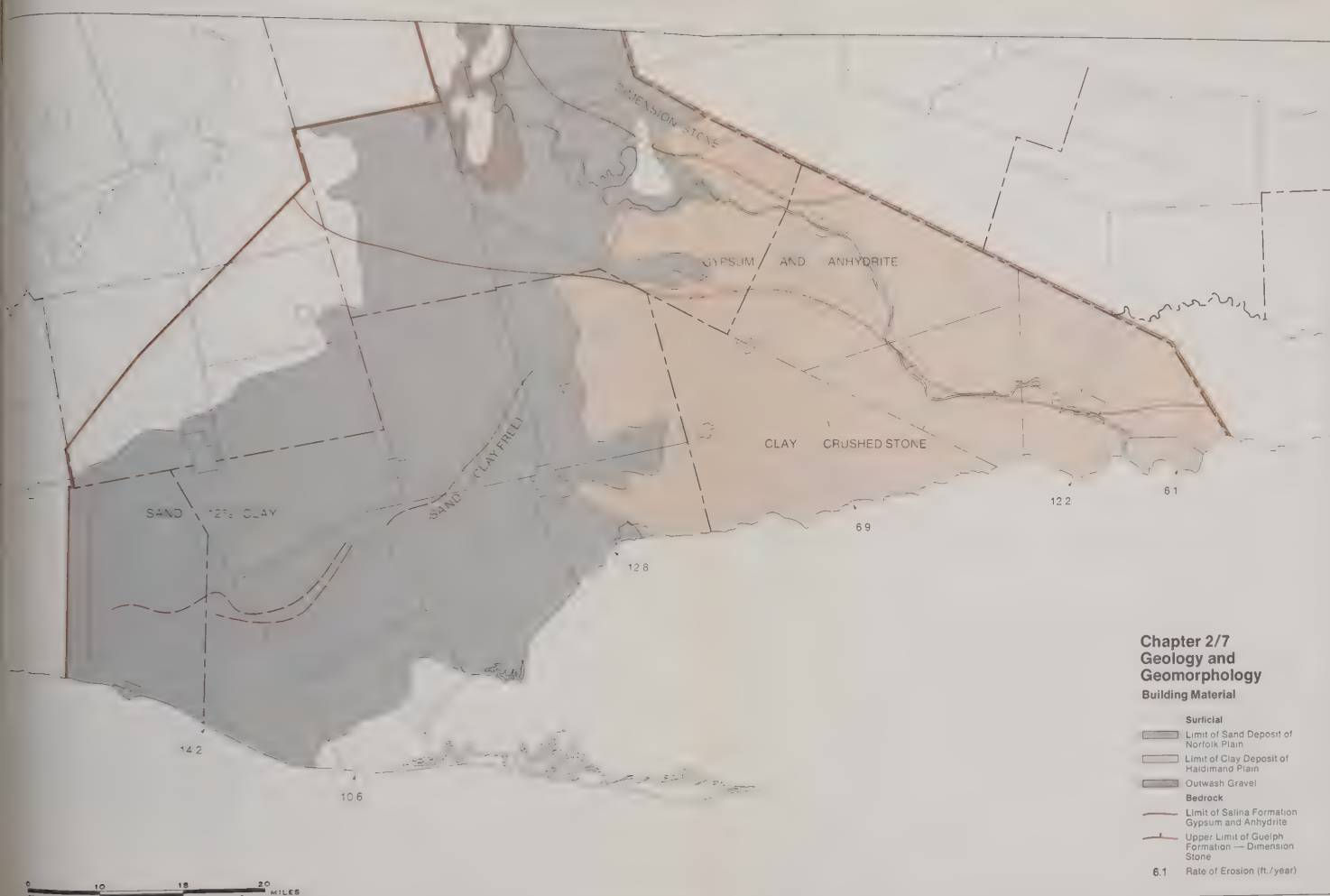
Contour Intervals 10 Feet
and 50 Feet

0 10 15 20 MILES





Chapter 2/6
Geology and
Geomorphology
Distribution of
Natural Gas Wells



Chapter 3/1
Meteorology and Air
Pollution Climatology
Land Use Suitability

-  Suitable Location for Heavy Industry
-  Green Belt
-  Recreation and Light Industry
-  Agriculture Giving Way to Light Industry
-  Frost Prone Areas of High Pollution Potential
-  Area Suitable for Residential Development
-  No Major Industrial Development; Parklands should be protected

0 10 15 20 MILES



Chapter 4/1 Historical Ecology

Composite Patterns of Original Vegetation






- 1/Climax Upland Hardwood: Hard Maple, Beech, Elm, Basswood
- 2/Mixed Upland Hardwood: Butternut, Chestnut, White Ash, Cherry
- 3/White Pine
- 4/Oak: All species except Swamp
- 5/Hemlock
- 6/Walnut
- 7/Lowland Hardwood: Black Ash, Soft Maple, Sycamore
- 8/Lowland Conifers: Cedar, Tamarack
- 9/Lowland Brush: Alder, Willow
- 10/Fire
- 11/Thicket
- 12/Windfall or Hurricane
- 13/Oak Plains
- 14/Meadow or Marsh



Chapter 5/2 Water Resources

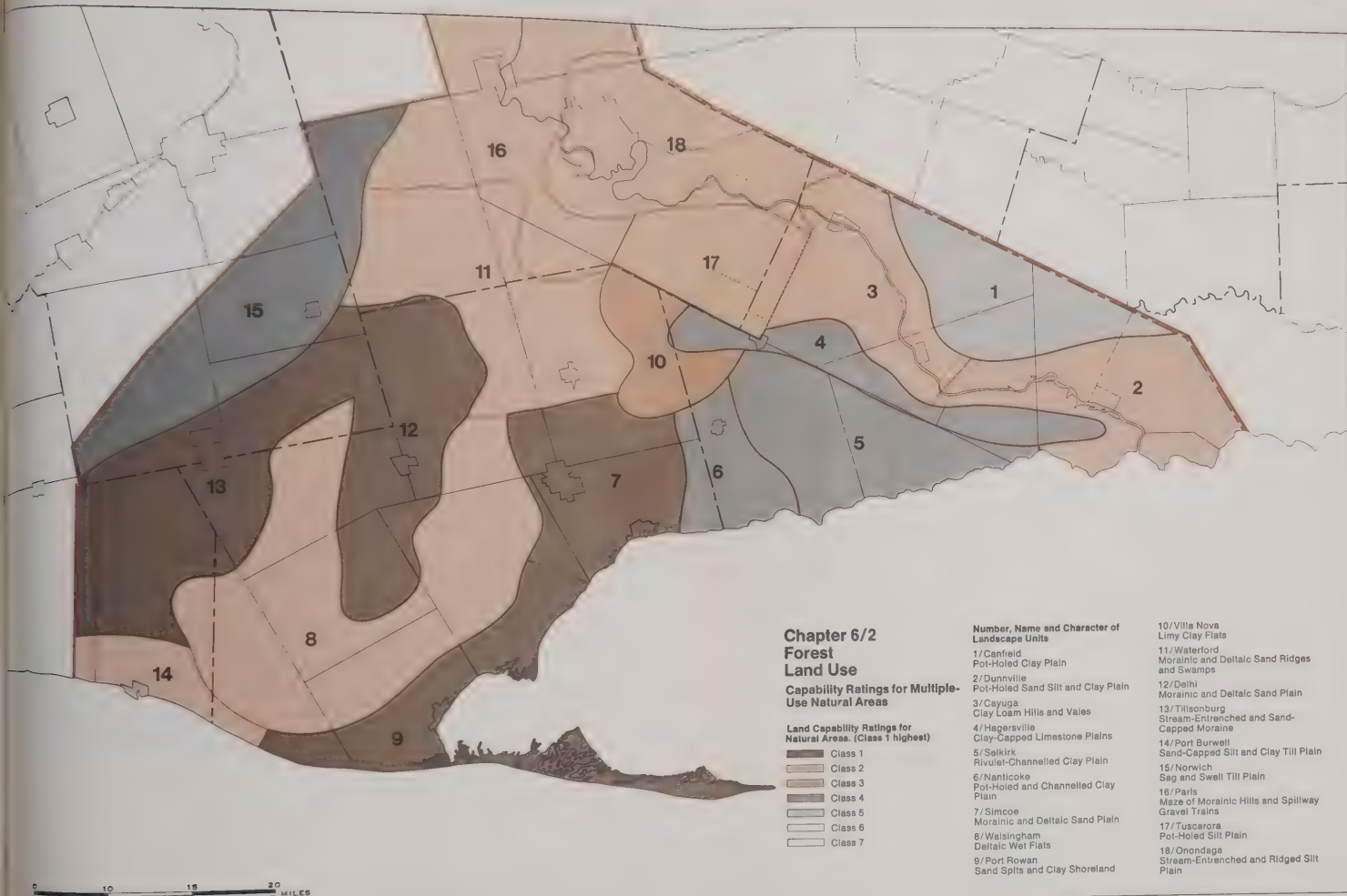
Availability of Groundwater

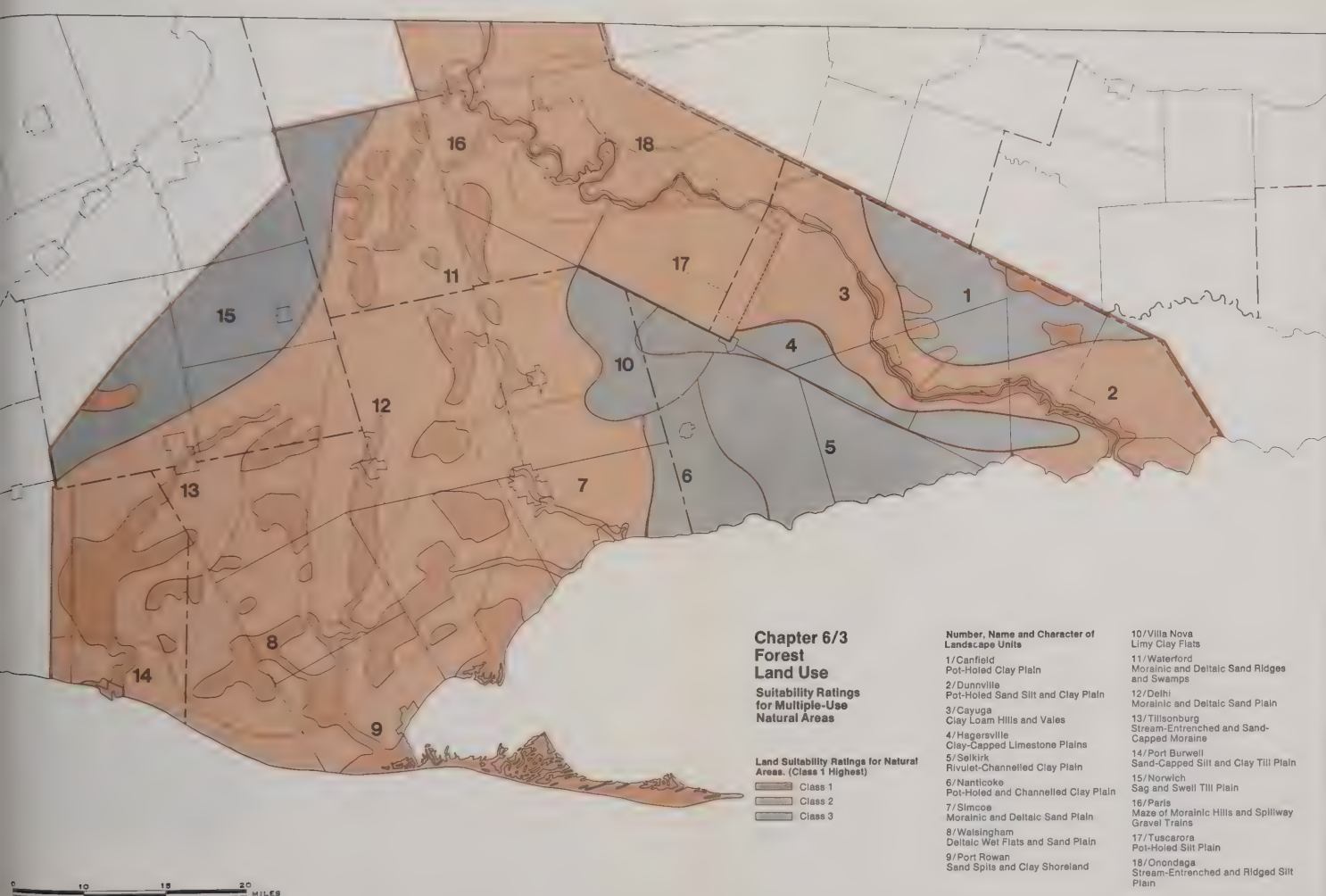
Note: No separation of overburden from rock wells has been made in this figure.

-  Areas where wells are likely to produce less than 3 GPM which is generally insufficient for any purpose.
-  Areas where wells are likely to produce 3 to 10 GPM which is generally adequate for domestic and livestock purpose.
-  Areas where wells are likely to produce 10 to 25 GPM which is a plentiful supply for all agricultural purposes except irrigation.
-  Areas where wells are likely to produce 25 to 50 GPM which is adequate for small urban communities.
-  Areas where wells are likely to produce over 50 GPM. Supplies are adequate for most purposes other than large industrial and urban centers.

0 10 20 MILES















0 10 20 MILES















Chapter 9/1
Wildlife
Resources

Proposed Fisheries

- Acquire for Fish and Wildlife Production and Utilization
- New Development Areas
- River Basin and Water Quality Control

0 10 15 20
MILES



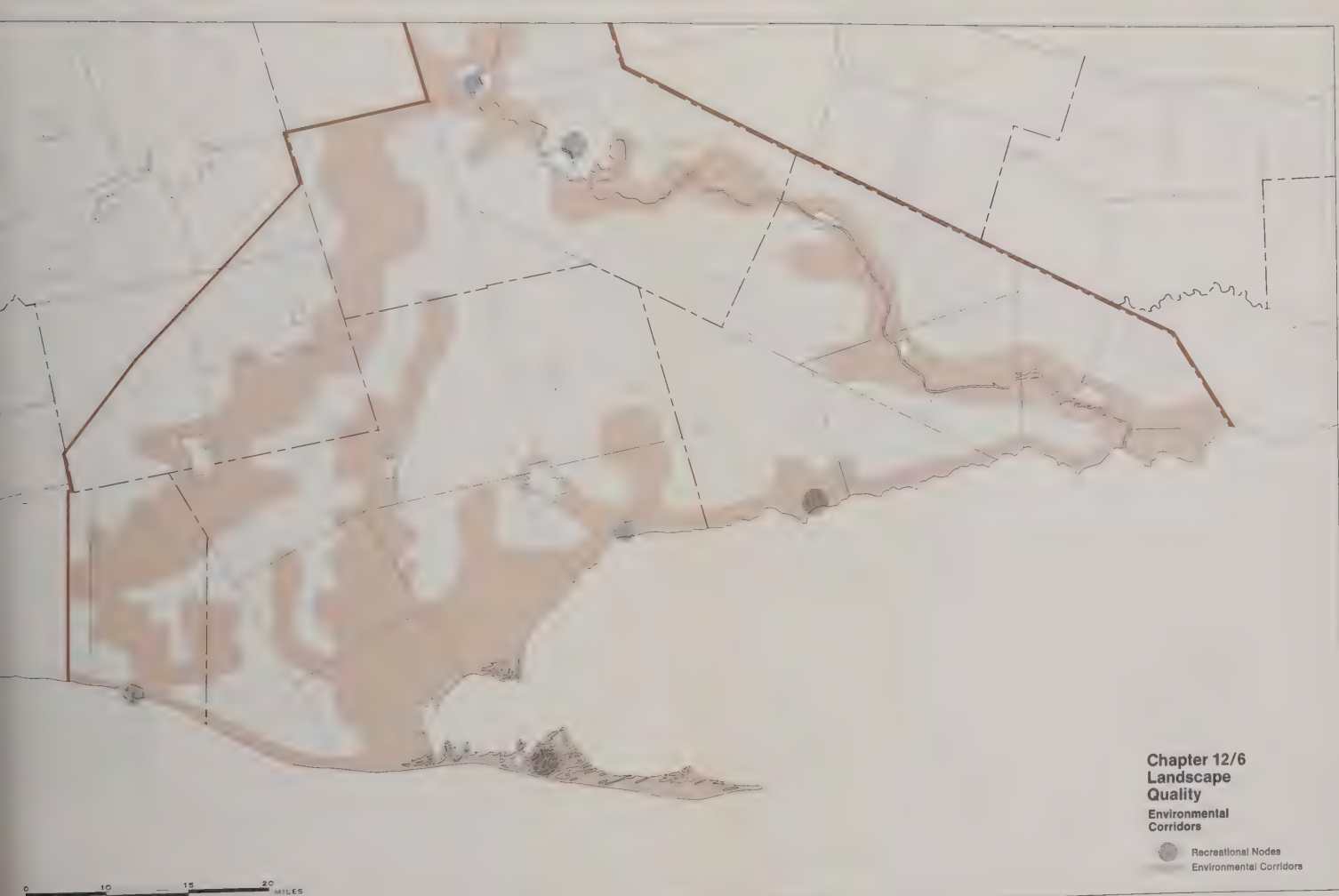


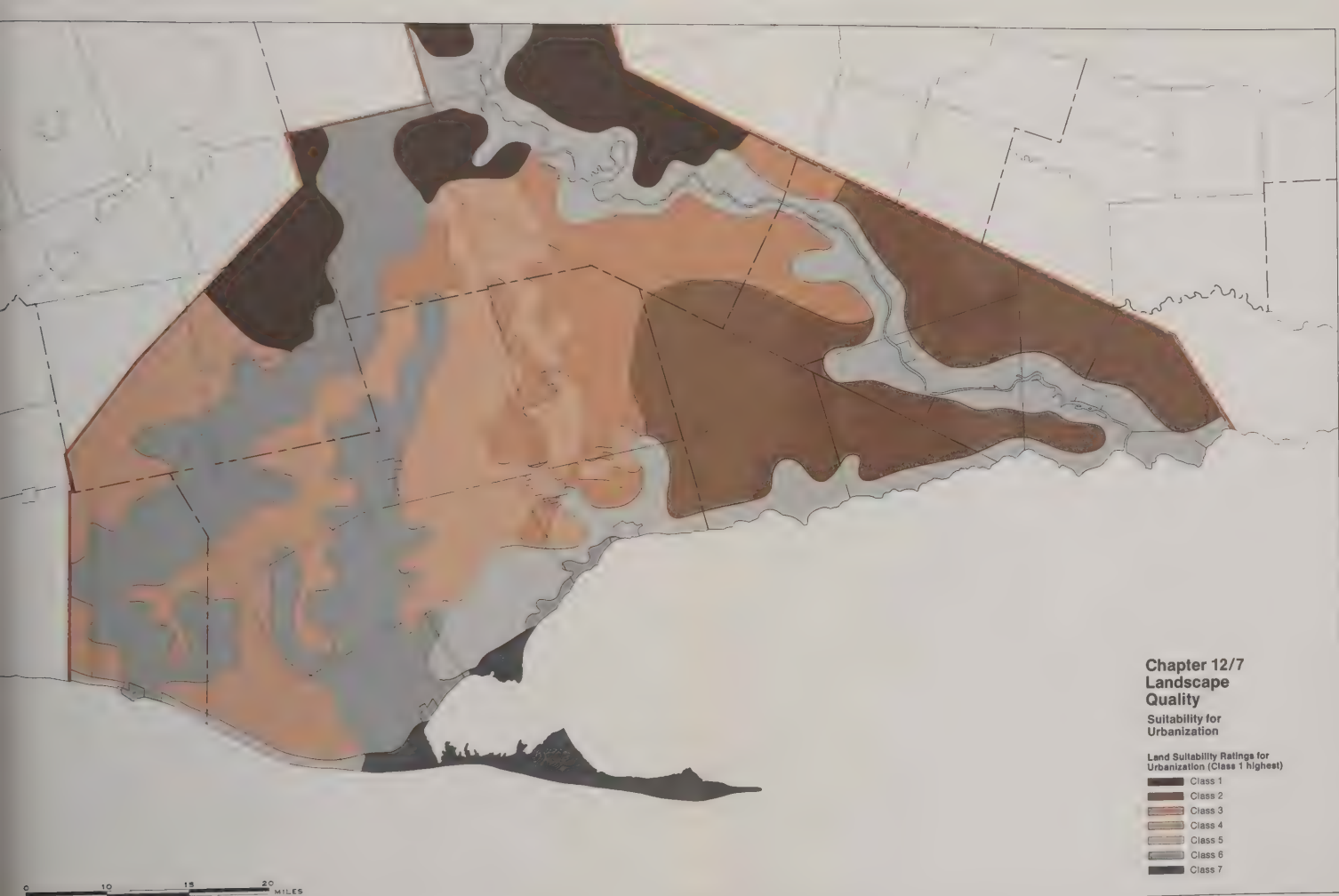


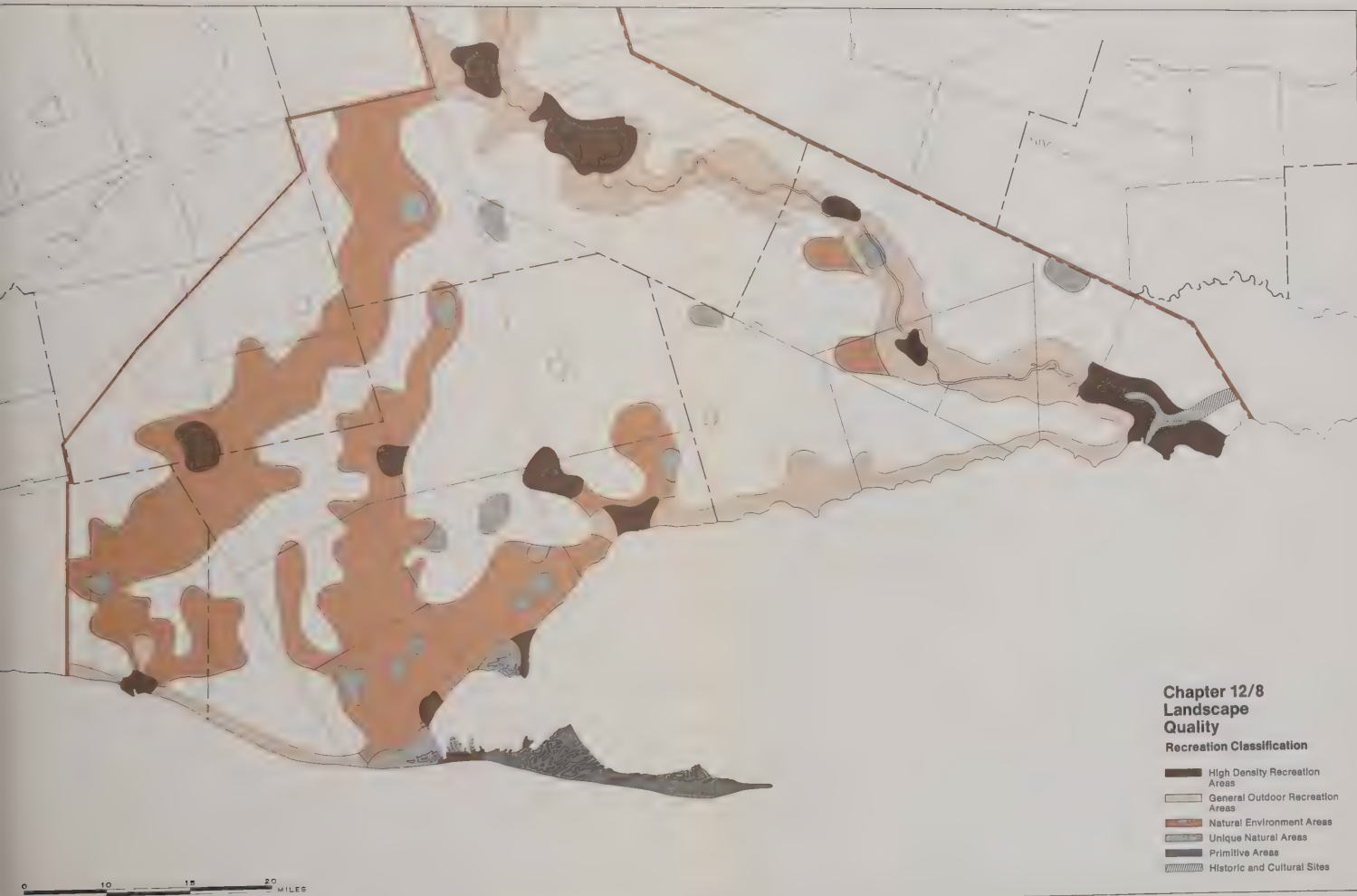












BINDING SECT. MAY 22 1973

